DIESEL PROGRESS

IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

AUGUST, 1935 CIRCULATION OF THIS ISSUE—IN EXCESS OF 10,000 COPIES 25c

THE FOLLOWING MANUFACTURERS HAVE TESTED OR EXAMINED THE QUALITY OILS MANUFACTURED BY GULF FOR DIESEL ENGINE LUBRICATION AND HAVE PRONOUNCED THEM SATISFACTORY FOR THE LUBRICATION OF THEIR DIESEL ENGINES.

GULF

Allis-Chalmers Manufacturing Co.
ANDERSON ENGINE & FOUNDRY COMPANY
ATLAS IMPERIAL DIESEL ENGINE CO.
Benz Diesel
Bethlehem Steel Company
BOLINDERS
BUSCH-SULZER BROS. DIESEL ENGINE CO.
CATERPILLAR TRACTOR CO.
CHICAGO PNEUMATIC TOOL COMPANY
CLARK BROS. CO.
Colo-Diesel
CONTINENTAL GIN COMPANY
COOPER-BESSEMER CORPORATION
CUMMINS ENGINE COMPANY
DE LA VERGNE ENGINE COMPANY
ELECTRIC BOAT COMPANY
F. A. B. Manufacturing Co.
Fairbanks, Morse & Co.
Foos
FULTON IRON WORKS CO.
HERCULES MOTORS CORPORATION
HILL DIESEL ENGINE COMPANY
Ingersoll-Rand Company
Junkers Corp. of America
Kahlenberg
Kromhaut Diesel Engine Co.
McINTOSH & SEYMOUR CORPORATION

Mianus
Muncie Oil Engine Company
NATIONAL-SUPERIOR COMPANY
NORDBERG,
R. A. Lister & Co. Ltd.
STANDARD MOTOR CONSTRUCTION CO.
STERLING ENGINE COMPANY
STOVER MANUFACTURING & ENGINE CO.
SUN SHIPBUILDING & DRY DOCK CO.
Superior Gas Engine Co.
THE BUCKEYE MACHINE CO.
THE BUDA COMPANY
The Hooven, Owens, Rentschler Co.
THE MICRO CORPORATION
THE OTTO ENGINE WORKS
The Power Manufacturing Co.
The St. Mary's Oil Engine Co.
THE UNION DIESEL ENGINE COMPANY
Tips Engine Works
VENN-SEVERIN MACHINE CO.
Washington Iron Works
Weber Engine Company
WESTINGHOUSE
WINTON ENGINE CORPORATION
Wolverine Motor Works, Inc.
WORTHINGTON PUMP AND MACHINERY CORPORATION

GULF DIESEL ENGINE LUBRICATING OILS

GULF

GULF REFINING COMPANY

District Sales Offices

Boston New York Philadelphia Atlanta New Orleans Houston Pittsburgh Louisville Toledo

DIESEL PROGRESS for August, 1935. Volume I, No. 4. DIESEL PROGRESS is published monthly by Diesel Engines, Inc., 2 West Forty-fifth Street, New York, N. Y. Rex W. Wadman, President. Acceptance under the Act of June 5, 1934, at Brooklyn, New York, authorized May 14, 1935. Subscription rates: United States and Pan American countries $3.00, Canada and all other countries $5.00 per year. Single copy price 25 cents in U. S. A., 50 cents for all other countries.

Outstanding DIESEL *Achievements*

VERNON, California

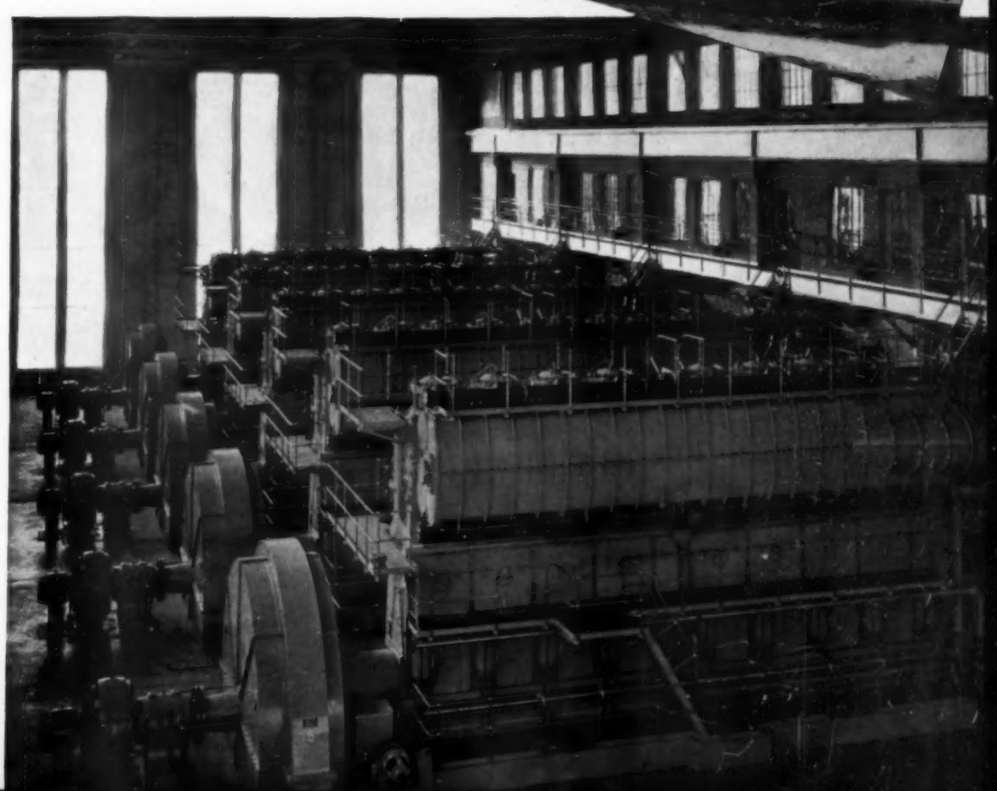
The Largest Diesel Plant

THE 35,000 hp. Municipal Diesel power plant at Vernon, California, celebrated its second birthday last month, demarking two years of consistent, economical production of power.

Vernon's Diesel plant is the largest, by far, in this country, consisting of five 7000 hp. HAMILTON-M.A.N. two cycle, double acting engines, bore 24″, stroke 36″, operating at 167 rpm.

Splendidly designed in the first place, well equipped in the second place and efficiently operated in the third place, Vernon's municipal power plant has built up a unique record for lost cost of power production and plant maintenance.

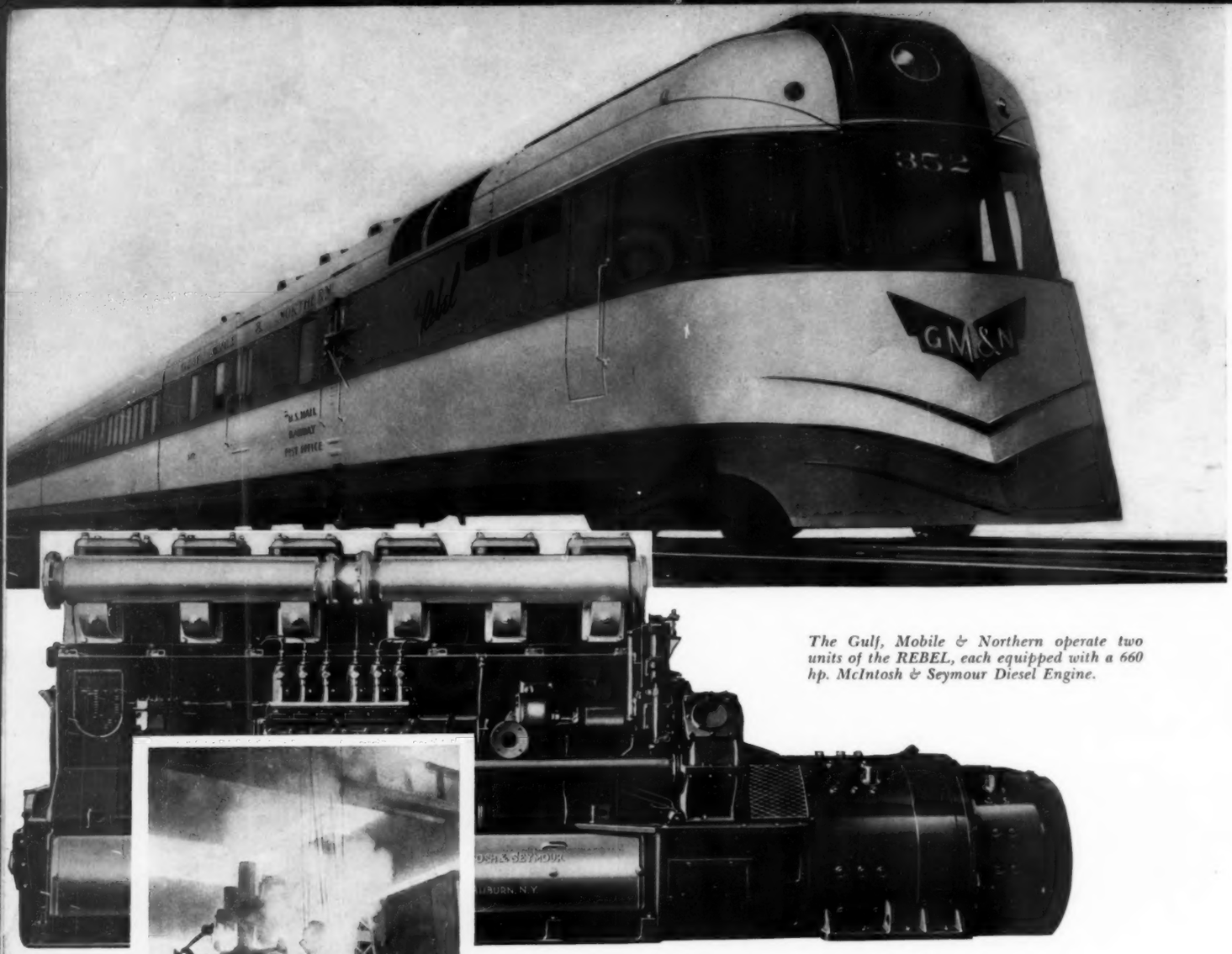
And again HAMILTON-M.A.N. Diesel Engines have contributed to another outstanding Diesel achievement.



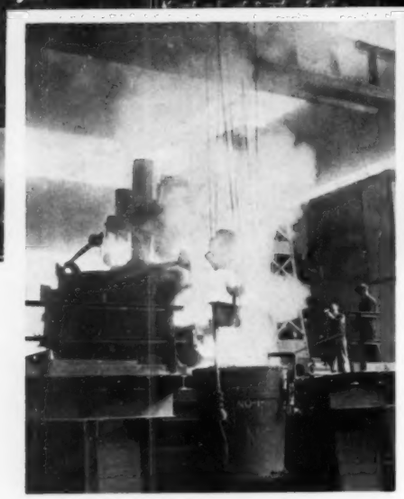
HAMILTON-M.A.N.

The Hooven, Owens, Rentschler Co.
Hamilton, Ohio

Division of General Machinery Corporation



The Gulf, Mobile & Northern operate two units of the REBEL, each equipped with a 660 hp. McIntosh & Seymour Diesel Engine.



Complete control of all Processing from selection of the melting charge to the finished condition is National Forge and Ordnance Company's guarantee for maintenance of quality in Crankshafts and various other types of forgings furnished to leading manufacturers in the Diesel Industry.

McINTOSH & SEYMOUR six cylinder, 660 hp. Diesel Engines are installed in the Gulf, Mobile & Northern's streamline train THE REBEL. The crankshafts for these two engines were manufactured by **National Forge & Ordnance Company.**

BASIC ELECTRIC STEEL

CARBON, ALLOY, CORROSION RESISTANT AND SPECIAL STEELS SMOOTH FORGED, ROUGH OR FINISH MACHINED, HEAT-TREATED TO SPECIFICATIONS . . . INGOTS AND FORGED BILLETS

National Forge & Ordnance Co.

Irvine, Warren County, Penna.

BUDA DIESELS

Are Standard on these Products

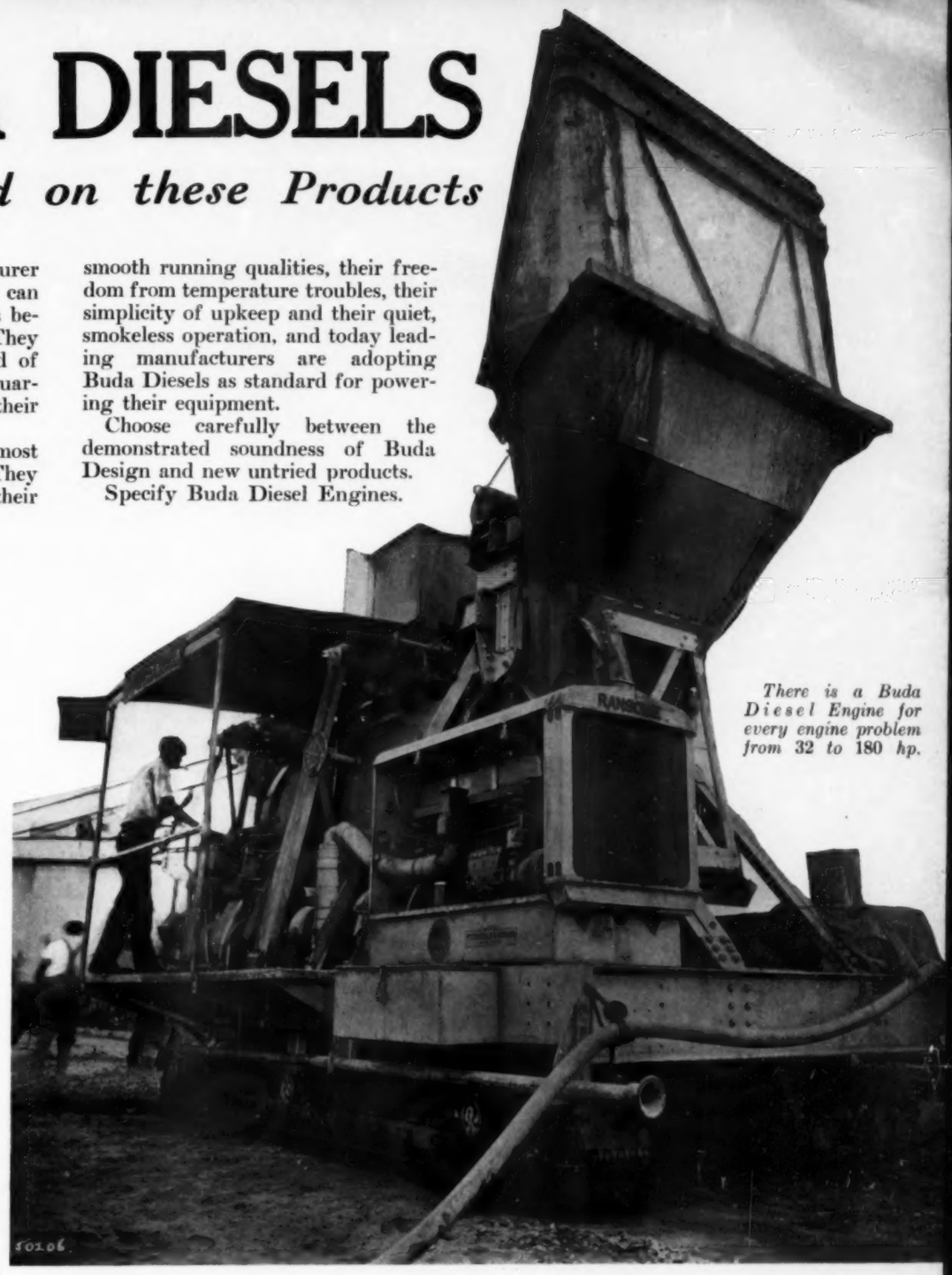
No other American manufacturer of High Speed Diesel Engines can bring you the experience that is behind Buda Diesel Engines. They have been proved over a period of 10 years' time — a period that guarantees the high quality of their service.

Many Budas have been in almost constant operation for years. They have amply demonstrated their smooth running qualities, their freedom from temperature troubles, their simplicity of upkeep and their quiet, smokeless operation, and today leading manufacturers are adopting Buda Diesels as standard for powering their equipment.

Choose carefully between the demonstrated soundness of Buda Design and new untried products.

Specify Buda Diesel Engines.

- Rollers
- Pavers
- Crushers
- Shovels
- Cranes
- Compressors
- Oil Field Pipe Line Pumps
- Dredges
- Irrigation Pumps
- Fire Pumps
- Water Well Drilling Equipment
- Oil Field Drilling Equipment
- Logging Equipment
- Locomotives
- Generator Sets
- Feed Grinders
- Refrigerators
- Boats
- Trucks
- Hoists
- Sweepers
- Busses



There is a Buda Diesel Engine for every engine problem from 32 to 180 hp.

THE BUDA COMPANY

HARVEY [Chicago Suburb] ILLINOIS

And Now Ransome Adopts Buda Diesels

Illustrated above is a Dual Drum Paver manufactured by Ransome Concrete Machinery Company and powered with a Buda Diesel. This particular unit is being operated by the B. Turecamo Contracting Co. on Flatbush Avenue, Brooklyn, N. Y.

BUDA ENGINES

IT STOPS *these* WASTES!

A 1,000-b. hp. Diesel engine will draw in 180,000 cu. ft. of air per hour. If the air contains 3 gr. per 1,000 cu. ft., 77 lbs. of dust and dirt will be drawn in every 1,000 hours.

These billions of sharp, abrasive dust particles cause excessive wear on all parts in sliding contact with each other.

By installing Protectomotor Air Filters on your Diesel engines, you can reduce such maintenance costs as liner wear, reboring and replacement — valve leakage, grinding, refacing and replacement — bearing wear, keying-up and replacement, etc.

Protectomotor Air Filters do away with the high cost of dirty air. They take dust-filled, grit-laden air and remove 999 of every 1,000 particles of dust.

It is a proven fact that these filters reduce wear 75 to 85% on moving parts of Diesel engines and any equipment operated by compressed air. Cut down carbon deposits 60 to 70% — making it unnecessary to clean valves for about one year. Enable machines to operate from 3 to 5 times longer without overhauling and before valves need cleaning. Reduce oil consumption 25%.

Protectomotor Filters are available for all types and sizes of Diesel engines, gas engines, air compressors, vacuum pumps and blowers; also for cleaning compressed air.

Intake Filter

30 DAYS' FREE TRIAL

Send for a Protectomotor Air Filter on trial. If not convinced in 30 days that it will save you many times its small cost, it may be returned for full credit.

Mail the convenient coupon before you forget it.

PROTECTOMOTOR
REG. U.S. PAT. OFF.
99 9/10 Per Cent EFFICIENT
AIR FILTERS

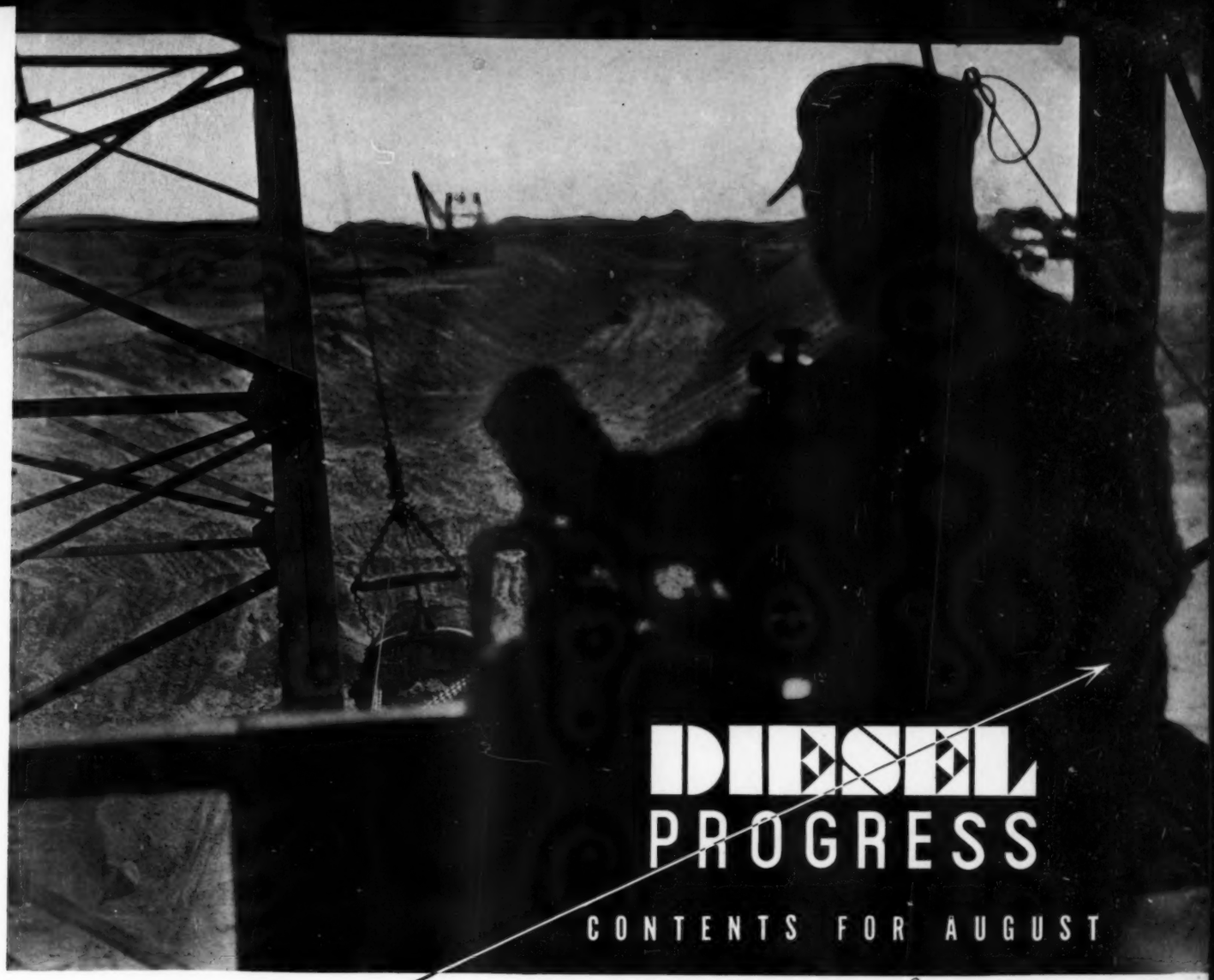
STAYNEW FILTER CORP.,
5 LEIGHTON AVE., ROCHESTER, N. Y.

Without obligation on our part, you may
☐ Send a copy of your catalog.
☐ Send a Protectomotor for use on.....
If not satisfactory after 30 days' service, it may be returned for full credit.

Name .....

Address .....

City..... State.....



DIESEL PROGRESS

CONTENTS FOR AUGUST

DIESEL PROGRESS for August, 1935, Vol. I, No. 4. Published monthly by Diesel Engines, Inc., 2 West 45th St., New York, N. Y. Tel. MUrray Hill 2-5092.

Subscription rates: U.S.A. and Pan American Countries $3.00 per year; 25c per copy. Canada and all other countries, $5.00 per year; 50c per copy.

Editor and Publisher.....REX W. WADMAN
Managing Editor.....FRANK M. PRENDERGAST

PAGE

KALAKALA, FIRST STREAMLINED FERRY..... 8

OUTSTANDING SAWMILL ECONOMY..... 11

DIESEL TRACTORS AND FARM PROFITS..... 12

SCHOTTLAND SILK MILL..... 16

IPSWICH, MASSACHUSETTS..... 20

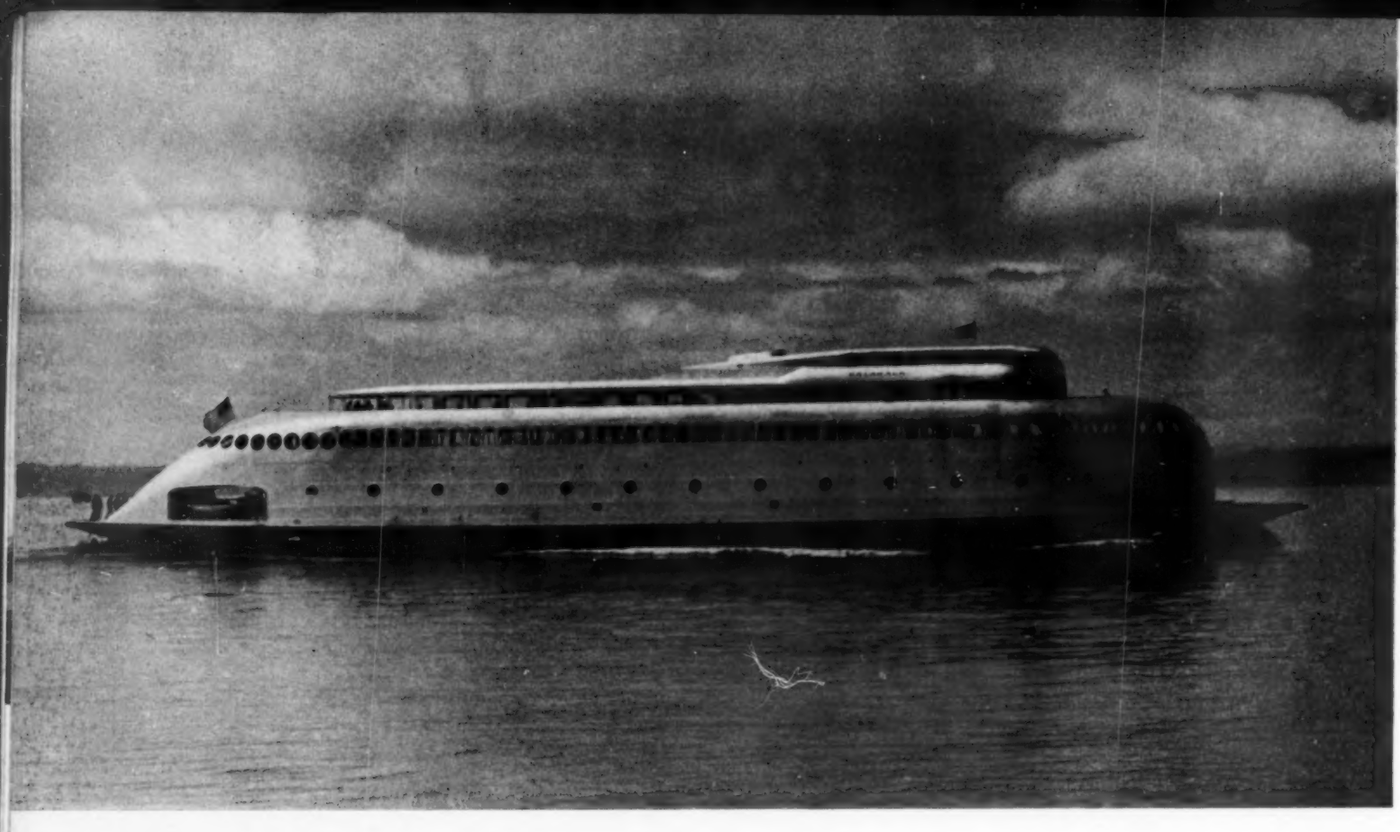
AND NOW, A DIESEL PAVER..... 22

LOGGING WITH DIESELS..... 24

REDUCING HAULAGE COSTS..... 26

THE DIESEL CRUISER, *ATIMCO*..... 27

WESTINGHOUSE SUPERCHARGED LOCOMOTIVE..... 30



BUSCH-SULZER DIESELS

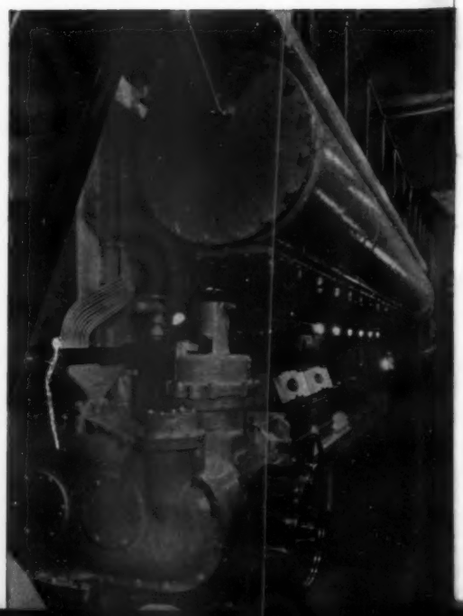
SELECTED FOR MOTOR FERRY KALAKALA

THE WORLD'S FIRST STREAMLINED SHIP

After two years' successful operation of the 2,130 bhp. Busch-Sulzer main engine and 375 bhp. auxiliary in the Motor Ferry *Chippewa,* Puget Sound Navigation Company again selected Busch-Sulzer in powering this spectacular addition to their fleet.

Simple single acting Diesels in this same proven design available in sizes up to 10,000 bhp. per engine.

Engine Room "Kalakala" Showing 3,000 bhp. Main Diesel



BUSCH-SULZER

ST. LOUIS, MO.

DIESEL PROGRESS

REX W. WADMAN, Editor and Publisher

OPPORTUNITY

There is a tide in the affairs of men,
Which, taken at the flood, leads on to fortune;
Omitted, all the voyage of their life
Is bound in shallows and in miseries.
On such a full sea are we now afloat;
And we must take the current when it serves,
Or lose our ventures.

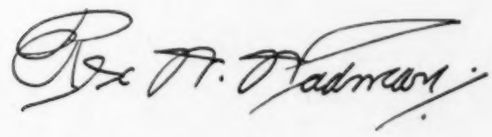
—William Shakespeare

ON such a full sea we are now afloat — and how true that is when applied to the Diesel Industry. Out of every big depression comes some outstanding economic development. Out of the late lamented depression comes the Diesel Engine to burst into the full bloom of its application, of the full appreciation of its economic worth.

It remains to the component parts of the Diesel Industry, its designers, its engine builders, its engine salesmen, to ride the flood tide, to offer and to intelligently sell the economic advantages of the Diesel Engine.

It remains to the users of power to investigate, with an open mind and with vision, the application of Diesel economy to their particular power problems.

One of the phenomena of recent months has been the tremendous increase in the production of Diesel Engines and the varied applications to which they have been applied. There is really nothing phenomenal about it — the Diesel Engine is simply just commencing to come into its own.



WORLD'S FIRST STREAMLINED FERRY IS DIESEL POWERED

THE world's first streamlined ferry is here. She is the *Kalakala,* just placed in service by the Puget Sound Navigation Company. As spectacular in her speed as she is in her appearance, she is writing at this moment an important page in the annals of water transportation.

Built to meet the needs of a rapidly increasing passenger and automobile traffic between Seattle and Bremerton she has cut the running time between these two points to 45 minutes. With a capacity of 2,000 passengers and 110 automobiles she travels at a cruising speed of 21 land miles an hour. And, of course, she is Diesel powered.

Completely streamlined from stem to stern, she is 270 feet long, with a beam of 55.8 feet. Loaded, she draws 13.5 feet of water. Graceful as a bird, if that term may be applied to a ferry, she is as carefully designed below the waterline as she is above, in accordance with the most modern standards of marine architecture, to overcome water as well as wind resistance.

The *Kalakala's* unusual speed, however, is due mainly to her engines. Her main engine is a 3,000 hp., 10-cylinder, 2-cycle Busch-Sulzer Diesel, the largest ever installed in a ferry boat. The foundation for this engine is over one hundred feet long and contains one hun-

Commodore Wallace H. Mangan, master of the "Kalakala."

dred tons of steel. The engine is direct connected to an 8½-foot propeller, which it turns at 230 rpm. The main engine is without auxiliaries of any kind, the entire 3,000 hp. being used for propulsion, driving the single screw. The engine pistons are visible through large plate glass ports, making it possible to see just what condition they are in at all times.

The auxiliary engine, itself more powerful than the main engines of many ferries, is a 600 hp., 8-cylinder, 4-cycle Busch-Sulzer Diesel. This engine is direct connected to a 400 kw. G-E generator which supplies the auxiliary equipment through the latest type of central, dead-front, dead-back switchboard. All the auxiliary units are electrically operated and can be started and controlled at the switchboard. Aboard the ship are a total of 112 electric motors. Practically everything aboard is done with a push of a button.

Both engines are fresh water cooled and the temperature of either engine can be controlled to a fraction of a degree.

Not only do the Diesel engines furnish power for propulsion and generate electricity for the auxiliary needs, but they supply heat as well. A cleverly designed boiler, utilizing waste heat from both engines, produces steam for heating the entire ship. A booster boiler is also provided for extreme cold weather.

Whether the season is hot or cold the *Kalakala's* passengers will never suffer from heat or chilliness as she is air conditioned to the extent of having a system of controlled ventilation within her enclosed and streamlined superstructure.

Apart from her highly efficient engines, the *Kalakala* is a distinctly outstanding example of marine construction as well. Divided into

25 watertight compartments, her all-steel hull is virtually unsinkable. Electric welding has given great strength and made it possible to do away with the many objections of ordinary steel construction. The entire ship is 97.75 per cent steel throughout. Curves replace the conventional angles and gracefully rounded "I"-beams have been used in place of the usual angle irons. There are no unsightly rivet heads or other objectionable details common to ordinary steel construction.

A large lubricating oil rest tank is located on the port side of the boat. Oil is taken from this tank through a strainer by a motor driven IMO pump, having a capacity of 360 gallons a minute at 40 pounds pressure, and circulated through the oil cooler of the main propelling engine. Oil is returned from the engine to a small sump tank by gravity and taken from this tank by another pump of the same type and capacity, and delivered back to the rest tank. The auxiliary generating unit is equipped with a separate lubricating oil system. One De Laval lubricating oil centrifuge is installed and arranged so that the oil from either engine system can be centrifuged.

Utmost safety is assured *Kalakala's* passengers from any fire hazard arising from gasoline on the automobile deck, as a new deck sprayer system of fire-fighting equipment has been provided.

Commodore Wallace H. Mangan, in command of the new ferry, has been master of Puget Sound Navigation vessels for more than thirty-one years. Chief Engineer Albert Thornton has served in the engine rooms of its vessels since 1902, and dates his experience with Diesels back to seven years ago when his ship, the *Chippewa*, was converted from a steam to a Diesel ferry.

Construction of the vessel was under the direct supervision of James E. Murphy, Marine Superintendent, and Helmuth W. Schmitz, Naval Architect of the Puget Sound Navigation Company. Both men are widely known in marine circles.

Captain Alex M. Peabody, son of the founder of the line, established in 1900 by the late Charles E. Peabody, is a believer in faster, better ferries. Under his administration the company has developed four fine passenger and automobile ferries, the *Iroquois, Chippewa, Quilcene* and *Rosario*, all plying on Puget Sound. *Kalakala* is his special pride.

One of "Kalakala's" luxurious lounges.

C. A. Petersen, owner, talks things over with the Diesel salesman.

General view of portable sawmill.

Close-up of McCormick-Deering P.D.-40 Diesel engine.

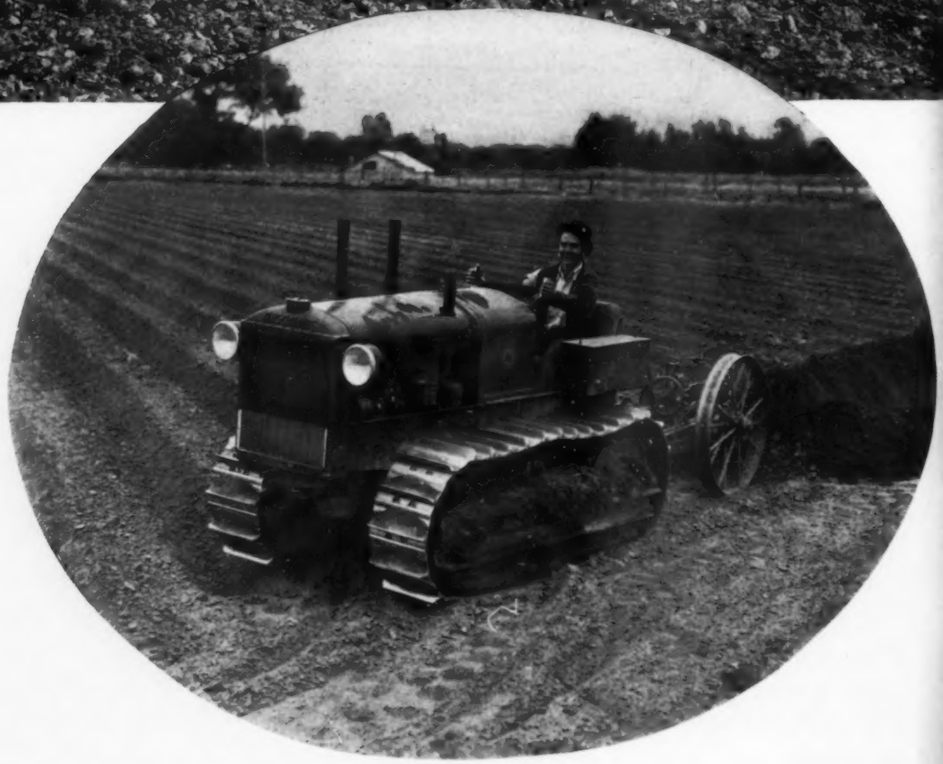
OUTSTANDING SAWMILL ECONOMY

IN operating the smaller portable sawmill outfits, especially in isolated districts, Diesel engine units are proving an unusually low-cost source of power. Their cost is low not only because they burn the lower-priced fuels, but also because they burn them more efficiently and in less quantities, thus enabling the operator to save money in fuel transportation costs which can mount to sizable figures where sawmill locations are considerable distances away from sources of fuel supply. Also, in the mountain districts of the West, where small portable sawmills are frequently used, Diesels operate with less power loss because of more efficient combustion with the decreased supply of oxygen available at the higher mountain altitudes. Finally, the Diesel is safer than steam power outfits because of greatly reduced fire hazard.

Christian A. Petersen, who operated a sawmill outfit in the Rhododendron district of Oregon near Mt. Hood the past season, was able to lower his cost of operation very considerably by changing from a 45 hp. gas engine to a Diesel power unit. With the gas engine he had been cutting 9,000 board feet in an eight-hour day at a cost of $5 a day. With the McCormick-Deering P.D.-40 Diesel power unit, which consumed two gallons of fuel oil per hour, he boosted his daily output to 15,000 board feet at a cost of only 85 cents a day. Thus, he not only greatly decreased his power cost but also increased his profit because of increased output.

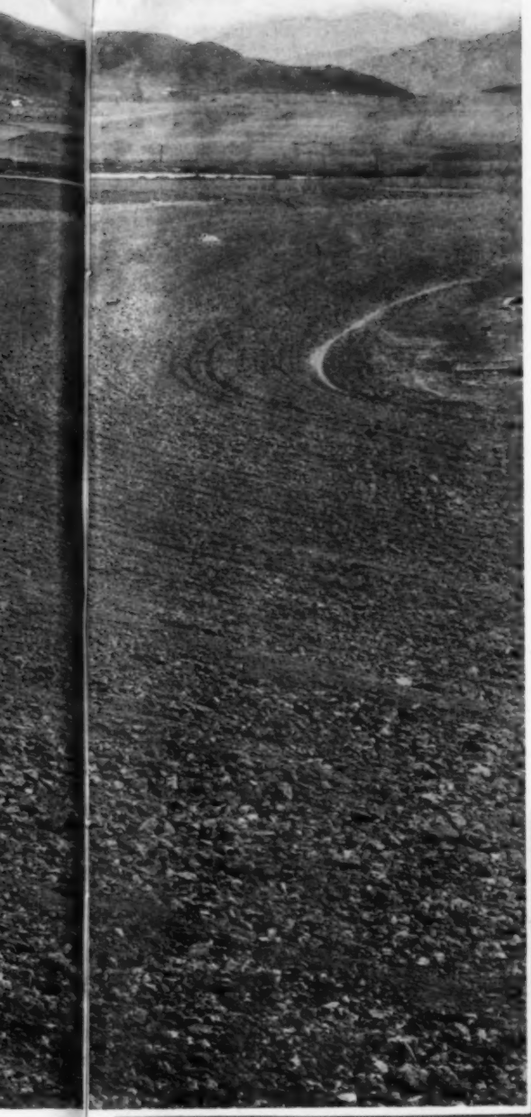
Mr. Petersen was sawing large Douglas fir logs taken from a 320-acre tract. Usually, he said, he worked 40 acres with the sawmill at one location and then found it cheaper to move to a new place. Each 40 acres produced from 900,000 to 1,200,000 board feet and it took him from 60 to 90 days to work the 40 acres. Mr. Petersen employed twelve men. Six of these were at the mill as follows: two on the roll-way, one sawyer, one off-bearer, one cut-off man and one man to take away from cut-off saw. Six men were also in the woods, as follows: two fellers and buckers, two teamsters, and two swampers. The finished material, which was mostly railroad ties, was hauled away by two motor trucks on contract, which were operated day and night.

Above — Preparing seed bed on a 1,200-acre wheat field at Winchester, Cal. This Hercules powered Cletrac, pulling two double disks and a four-section, peg-toothed harrow, operates on less than two gallons of fuel an hour.



Right — A contented farmer — even a happy one. "Eighteen years of tractor farming and this is the greatest one we ever owned!" says this owner of a Waukesha-Hesselman-engined Allis-Chalmers.

On opposite page — Working 22 hours out of every 24, in two eleven-hour shifts, this Diesel Caterpillar tractor saves its operators in fuel costs $18.00 a day.



DIESEL TRACTORS ARE BRINGING BACK FARM PROFITS

By F. HAL HIGGINS

OPTIMISM is beginning to flood the Golden West again. Once more farmers and ranch owners are hustling and whistling. By the simple American expedient of beating production costs through the adoption of new cost-cutting methods, they are entering a new era of balanced prosperity.

It's the Diesel tractor this time, with its scale-down of power costs that makes it more profitable to work acreage than allow it to lie fallow. As Diesel tractors purr their way up and down valleys and cross back and forth over western plains in ever-increasing numbers, four different manufacturers are trying to keep up with the demand for them.

Back in Peoria, Cleveland and Milwaukee, factories have been running night shifts for months. Annual and quarterly reports of tractor sales and net profits make good reading for investors.

While the Diesel tractor movement started on the West Coast in the latter part of 1928 it did not get under way on a large scale until the depression had stopped many industries in other lines. In the fall of 1931 one of the Big Four tractor manufacturers, after much careful preparation placed two Diesel-powered tractors in California, following these two deliveries with others scattered over a wide territory in California, Oregon and out across the Pacific as far away as Hawaii.

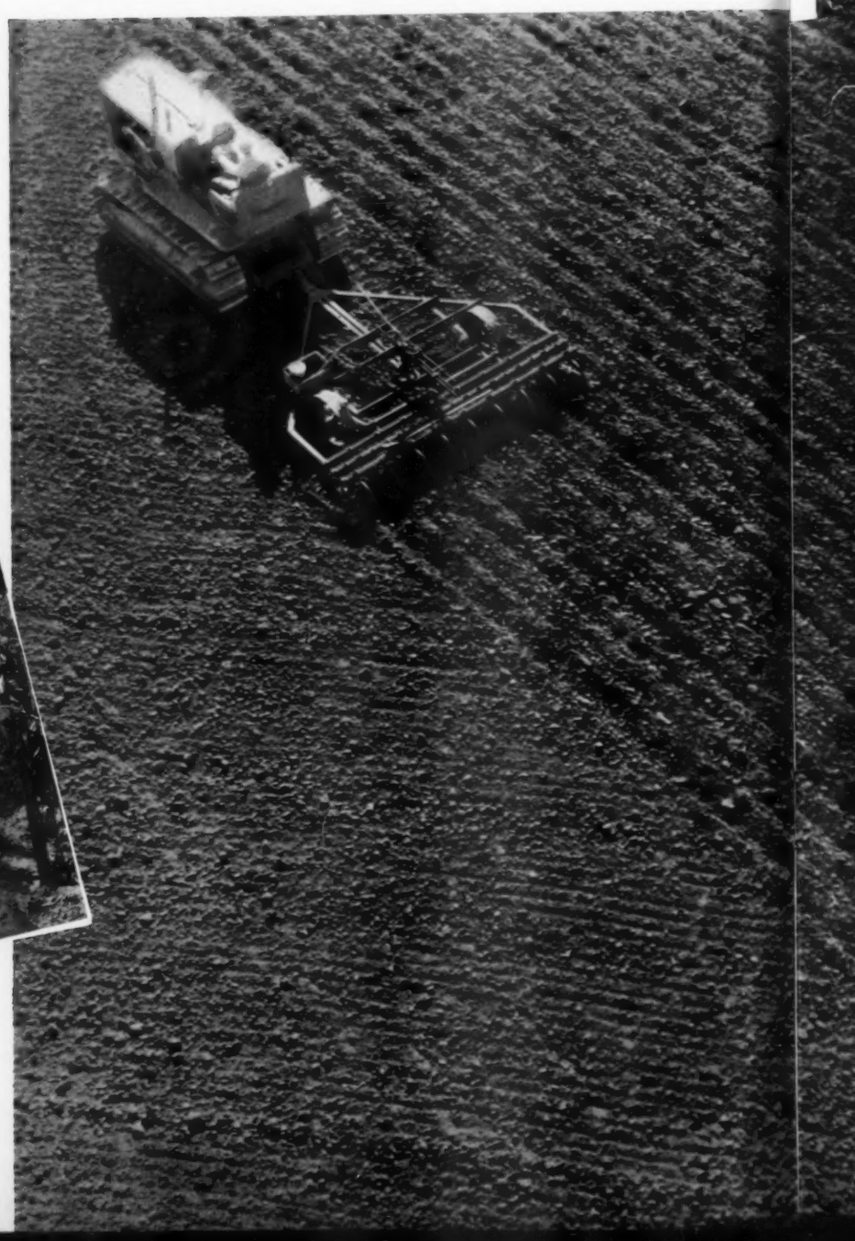
Today, in the eight states west of the Rockies, there are more than 2,500 Diesel tractors in use, four different makes with engines ranging from 35 to 80 hp. All but a couple of hundred are contained in California, Oregon, Washington and Arizona. Three-fourths are employed in agricultural work on large farms where 1,000 to 5,000 working hours per year enable them to make big savings in fuel costs.

The engineering departments of the various agricultural colleges which have been keeping a check on this Diesel-ization of farms estimate that the costs of fundamental farming jobs have been cut squarely in half. They point to rates quoted by custom operators who plow, disk, harrow, seed and harvest at so much an acre. Regardless of whether one takes the figures from the Imperial Valley of California, from Mexico where deep plowing is done, or the Salt River Valley of Arizona where the depth of plowing is only half that in the Imperial Valley, or moves up to the light, ashy soil of eastern Oregon and Washington, the cost of plowing has been cut in two.

. . . . *And now please turn to page 35*

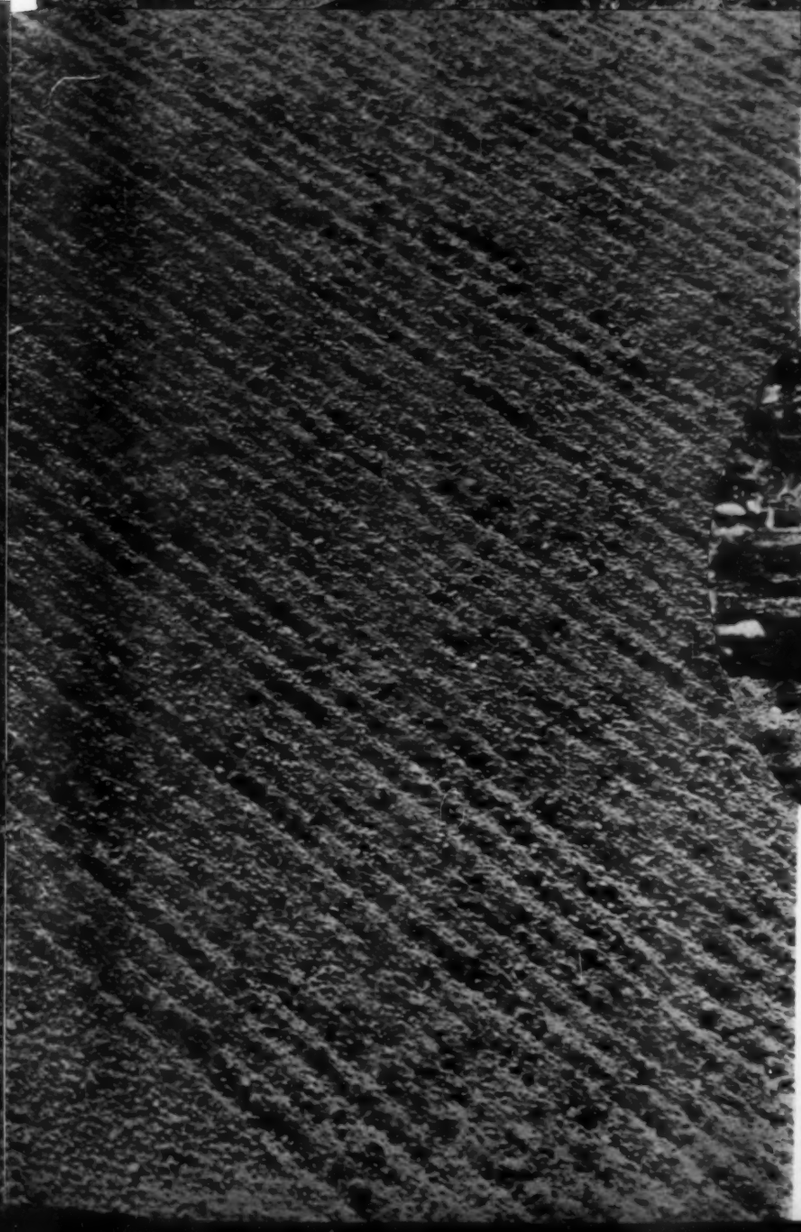
Hauling lettuce from a muddy Arizona field.

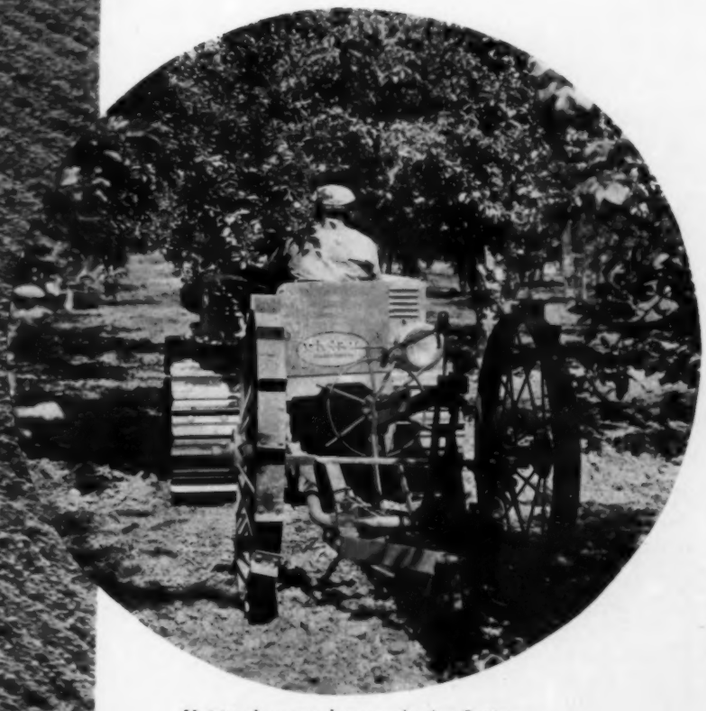
Straight lines. A bean crop in the making.



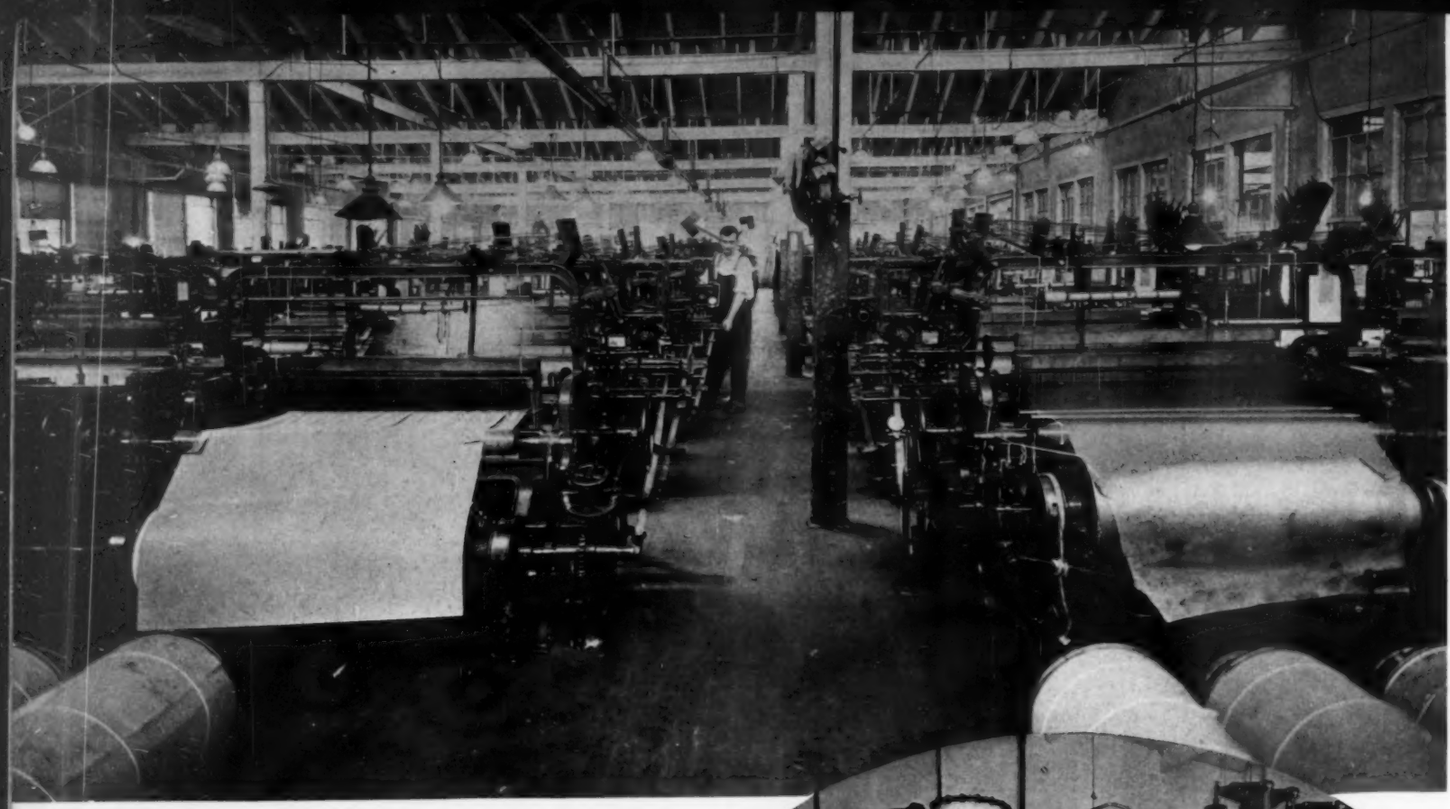
Laborers in the vineyard. This International Harvester tractor proves worthy of its hire, with a fuel cost of only 60 cents a day.

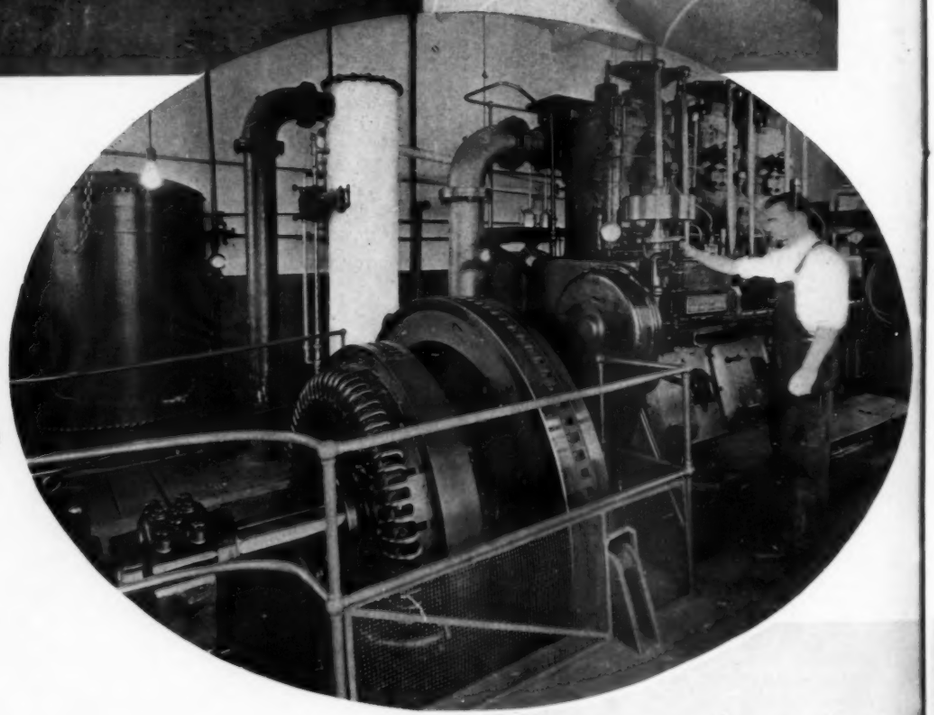
Neither carburetor nor ignition troubles hamper this grower of grapes and cotton.





Happy days are here again for Santa Clara prune orchard owners, so many of whom have switched to Diesel tractors.





"THE BEST INVESTMENT WE EVER MADE"

—*Says* A. SCHOTTLAND, INC.

UNDOUBTEDLY one of the best examples of Diesel efficiency that exists in industry today can be seen in the silk mill of A. Schottland, Inc., Nanuet, N. Y.

Here, a single 200 hp. Diesel engine, without standby power of any kind, has been running the entire mill since 1926, and has given continuous service without one breakdown during the whole period.

Alternating current furnished by a 130 kw. G-E generator, direct connected to the three-cylinder De La Vergne engine, runs the electric motors that operate 154 looms, 6 warping mills, 6 winding machines, 6 quilling machines, a sizing machine and a picking machine.

The Diesel-generated current also lights the entire building, operates a 3 hp. electric pump that lifts water from an artesian well at the

rate of 180 gallons a minute, as well as a small coal stoker firing a boiler that supplies steam for the sizing machine and furnishes heat for the mill in winter.

A. Schottland, Inc., started manufacturing operations in 1910. Previous to generating its own power it purchased current from the local utility company. Because of numerous breakdowns, poles falling during storms, poor service and high costs, the Schottland company finally decided to install its own power plant, and in 1926 purchased the present engine, a 200 hp. three-cylinder De La Vergne Diesel, equipped with a standard flyball type governor, which regulates the speed of the engine within very close limits.

The Schottland organization feels very proud of the fact that its Diesel has given such outstanding service and runs so smoothly without practically any vibration.

"We found our Diesel engine the best investment we have ever made," declares Mr. A. Schottland, president of the company.

Running 16 hours a day, since the mill operates on two eight-hour shifts, the engine consumes 100 gallons of fuel daily.

Despite the fact that the engine has been operating continuously for 16 hours a day and is now rounding out its ninth year of service, it has given the most satisfactory performance and has never broken down. Valves are ground every three months if they show signs of wear. Pistons are taken out for examination every six months. The piston rings last four to five years without replacement. Oil is changed every three months.

A. Schottland, Inc., weaves silk and synthetic fabrics. In the manufacture of textiles it is vital that machines operate at a steady, even rate. Tension on the thousands of fine silk threads that are drawn into the looms must be maintained at just the right degree. The rate at which the looms operate must be constant. Any sudden change in speed caused by fluctuations of current is quite apt to break the slender threads and slow down production. That endangers profits. Diesel-generated current meets the exacting demands of the Schottland mill's textile machinery because it insures a smooth, uninterrupted flow of power at all times.

The three-cylinder De La Vergne engine installed in the Schottland plant is a heavy duty type, 14½" bore by 18" stroke, developing 200 hp. at 277 rpm.

Two things are noticeable about its performance: first, the quietness, and second, the clear exhaust. Both are the result of the manufacturer's fuel injection system. Two fuel sprays enter the combustion chamber at opposite points and meet in the center of the combustion chamber above a large throat, which connects the combustion chamber with the cylinder proper. The displacement of air by the piston in the cylinder causes a sweep of air through this throat and high turbulence in all parts of the combustion chamber.

The fuel jets are injected at comparatively low pressure and through comparatively large holes. In consequence, the fuel injection pumps, of which there is one for each cylinder, operate without hammer blow and with resultant smoothness and quietness. The high turbulence in the combustion chamber takes care of the fine distribution and complete combustion of the fuel. The result is practically an invisible exhaust.

Many engineers have commented on the fact that the Schottland plant has been kept running on schedule for nine years with only one engine and without standby service of any kind whatsoever. This degree of reliability is by no means exceptional, say those who have had practical experience with well designed, heavy duty Diesels.

Diesel installations are much simplified financially and technically if it is once accepted that the reliability obtained with a single unit is sufficient for the operating schedule of a given industrial plant which may call for between 40 and 80 hours a week.

Wherever Diesels have been installed in textile plants, and the number is steadily growing from year to year, they have proved ideally adapted for the purpose. Experience on the part of many mill owners has definitely shown their superiority over the other sources of power which they have replaced. As a result, Diesel interest in this field is rapidly spreading.

In the more recently installed Diesel plants, waste heat boilers, utilizing heat from the engine exhaust, furnish steam and the hot water used in processing, thus eliminating the necessity of an auxiliary coal or oil-fired steam plant.

When better and cheaper ways are required to produce dependable power in textile plants, Diesels will be ready to fill the job.

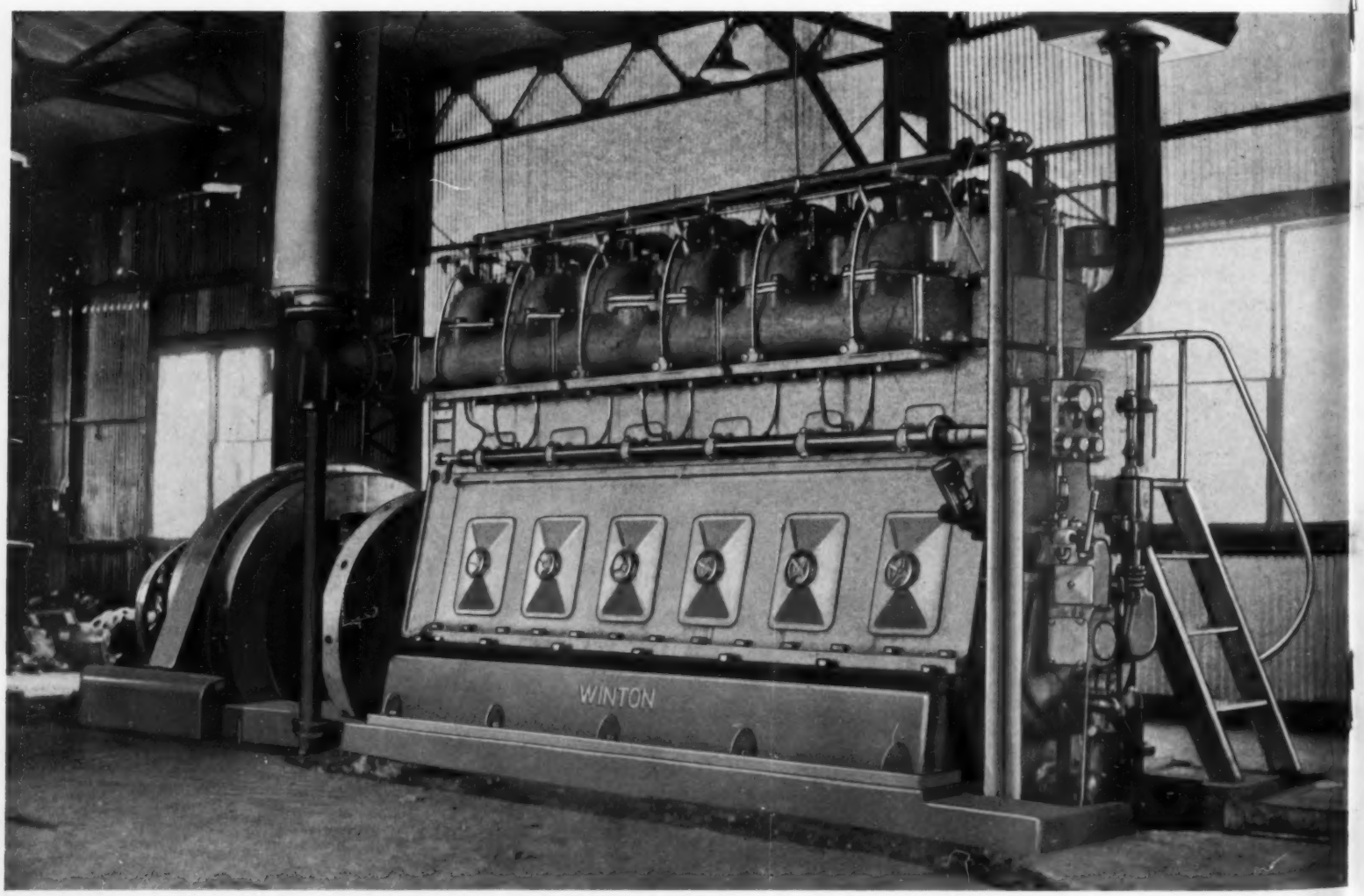
Now WINTON-DIESEL-POWER

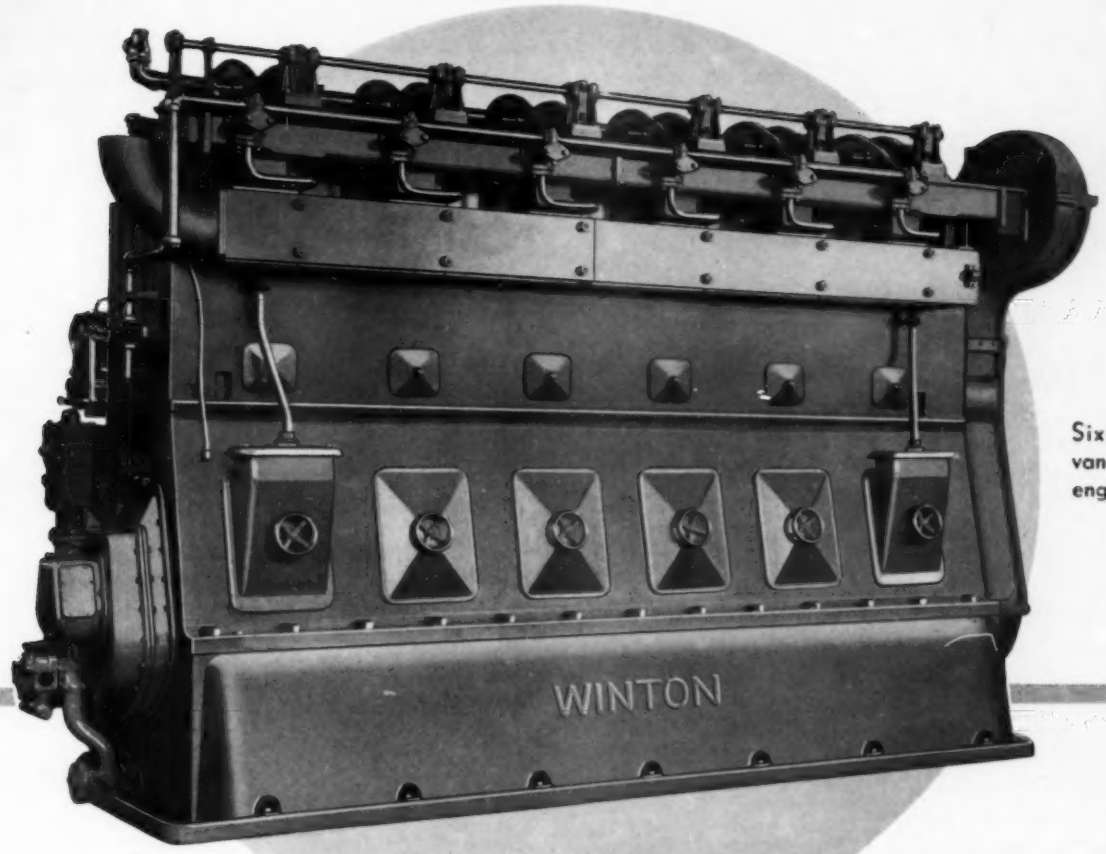
"Mans the Pumps"

THAT IRRIGATE A 13,000-ACRE COTTON RANCH AT MARINETTE, ARIZONA

Symbol of Economy and Dependability

Showing Winton-Diesel engine in process of installation at the Southwest Cotton Company's Ranch at Marinette, Arizona





Six-cylinder, 600 h.p. advanced-type Winton-Diesel engine selected for this modern power application

The Southwest Cotton Company, a subsidiary of the Goodyear Tire and Rubber Company, grows Egyptian or sea island cotton on its 13,000-acre cotton ranch at Marinette, Arizona. This is a very high quality cotton and carries a heavy premium over ordinary grades: being used in the fabric that goes into the production of truck and bus tires where great strength is demanded. In order to insure a crop of fine quality, proper irrigation is one of the outstanding problems of the Southwest Cotton Company. But irrigation is a costly factor! Ever alert to modern methods, the Southwest Cotton Company investigated the possibility of reducing the cost of operation of their irrigation pumps. The engine selected is a six-cylinder, 15½"x22", Winton-Diesel developing 600 h.p. at 250 r.p.m. It is direct connected to a 400 k.w., .8 power factor, 25 cycle, 440 volt alternator. Not only has this installation given twenty-four hour uninterrupted service, but its operation is a pronounced success from all angles, meeting every demand without failure. Thus modern Winton-Diesel-power again demonstrates its wide adaptability and suitability for installations requiring continuous heavy duty service at low operating costs.

WINTON ENGINE CORPORATION

CLEVELAND, OHIO, U. S. A.

IPSWICH, MASS.

More Than 300 Years Old, But Its Diesel Lighting and Water Pumping Station Is Thoroughly Modern and Efficient

IPSWICH, Mass., is famous for many things. It abounds with historical landmarks and is celebrated far and wide for its picturesque beach and sand dunes, and as the origin of a delectable item of sea food dear to the palates of many New Englanders – the famous Ipswich fried clams.

Yet, none of these things loom so large in importance to taxpayers and residents of the Town of Ipswich as its highly efficient municipal Diesel lighting plant and waterworks. Out of 365 cities and towns in Massachusetts, Ipswich ranks eighth lowest in electric rates.

With true Yankee foresight, the town fathers of Ipswich decided more than a generation ago to manufacture electric current for their local needs. In 1903 the town installed a steam plant. In 1926, realizing the advantages of Diesels they purchased two Diesel engines, a 340 hp. and a 240 hp. Fairbanks-Morse.

They proved so satisfactory that, later, the town decided to use Diesels entirely. The next step was the purchase of a Fairbanks-Morse 750 hp. unit in 1930, followed by the purchase of 500 hp. and 350 hp. Fairbanks-Morse engines in 1934, bringing the total Diesel horsepower to 1,600.

The plant, as it now stands, comprises one five-cylinder 16″ x 20″ engine developing 750 hp. at 257 rpm., direct connected to a F-M 515 kw. generator; one five-cylinder 12″ x 15″ engine developing 500 hp. at 400 rpm., direct connected to a 343 kw. G-E generator; and one five-cylinder 14″ x 17″ engine developing 350 hp. at 300 rpm., direct connected to a 235 kw. G-E generator.

These three units give the plant a total electrical capacity of 1,093 kw., which is generated at 2,300 volts and transmitted over a three-phase system at 60 cycles. The peak load is at present about 600 kw., so that the plant is ample to take care of future needs for some time to come. Each engine is equipped with a Maxim silencer and burns No. 2 fuel oil at 5 cents a gallon.

Here are the operating figures for the total kilowatt hours generated for the six months' period, July 1 to December 31, 1934.

Item	Cost	Cost per kwhr. in Mills
Fuel Oil	$ 5,338.18	4.55
Lubricants	676.50	0.58
Maintenance	278.42	0.24
Superintendence and Labor	5,374.00	4.59
Miscellaneous	126.61	0.11
Total	$11,793.71	10.07

Net Cost per kwhr. .01007 cents

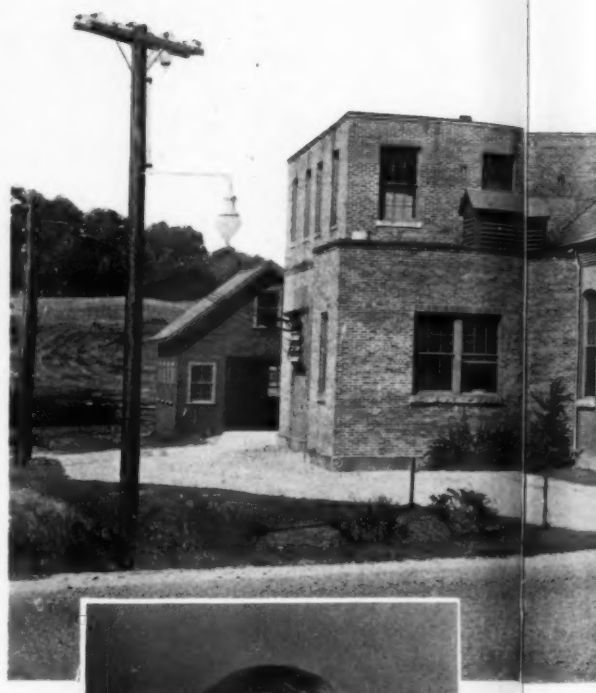
In the rear of the plant is a dam, fed by brooks and springs, that stores 52,000,000 gallons of water. The water is pumped electrically using a G-E 75 hp. centrifugal pump, with a capacity of 900 gallons per minute, and a 50 hp. F-M centrifugal pump, with a capacity of 700 gallons per minute. These two pumps carry the water to a reservoir 168 feet above sea level, giving an average water pressure of 60 pounds in the town faucets.

In the basement of the plant are located eight air tanks for starting the engine. These are kept filled by a 3 hp. air compressor. A 3 hp. Fairbanks-Morse gas engine is used as an auxiliary standby.

Raw water does not touch the engines. They are cooled by rain water, collected from the roof, which is carried to storage in the basement. The engines have three-way protection (1) rain water, (2) raw water through the pump in case of emergency, and also (3) pressure direct from the water supply system. They are governed by automatic valves.

The domestic rate for electricity in Ipswich is 7 cents a kw. the first 25 kwhrs.; 4 cents a kw. for the next 25 kwhrs.; 3½ cents for the next 100 kwhrs.; and all over 150 kwhrs., 3 cents a kw. On top of this is a 10 per cent discount for prompt payment. The commercial power rate is as low as 2½ cents a kw. for 1,950 kwhrs. a month or over.

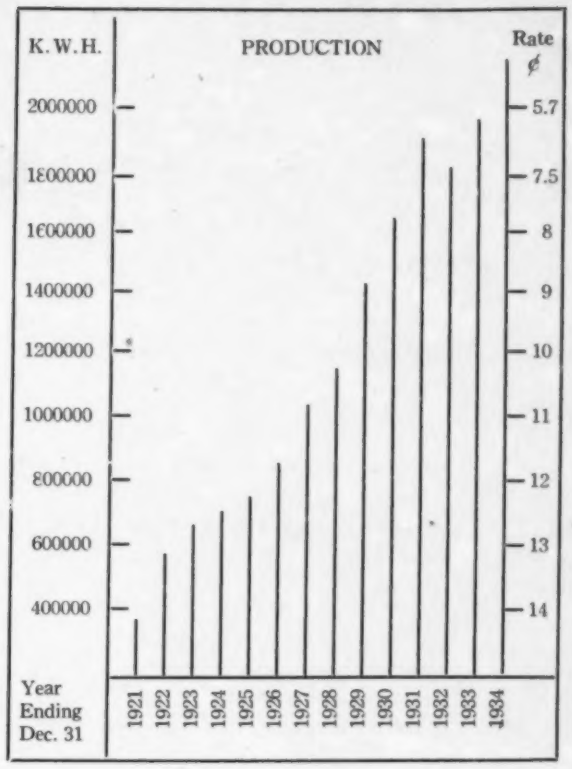
Since installation of the Diesel generating equipment the average cost of domestic current for lighting has dropped from 11.7 cents a kwhr. down to 5.4 a kwhr., *a reduction of more than 50 per cent.*

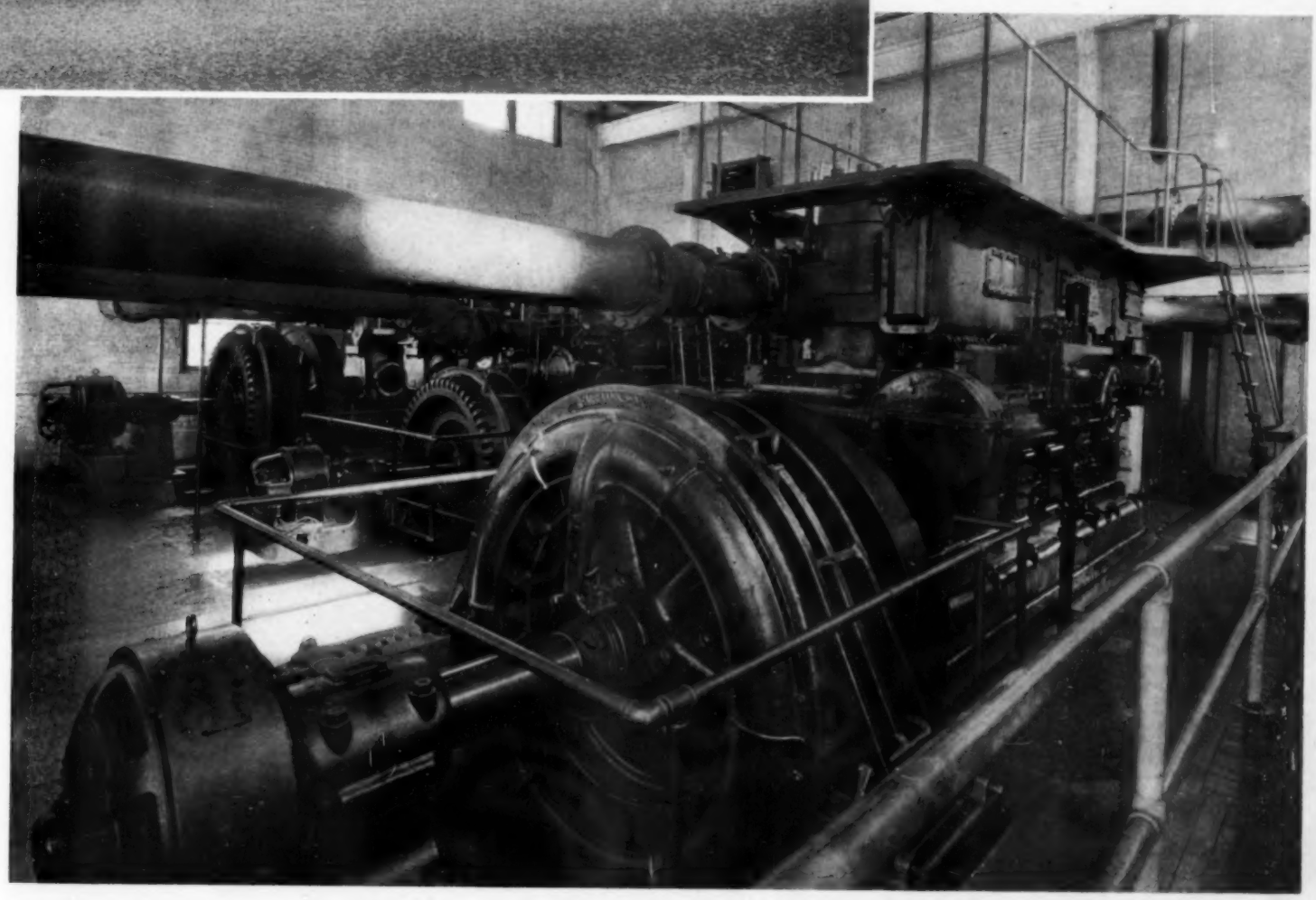


Charles A. Mallard, Manager of Water & Light Department.

Ipswich is highly pleased with its Diesel-powered municipal lighting plant and waterworks. It has given splendid service at a cost much below that which neighboring cities and towns are paying to privately owned power companies. Moreover, it is a neat asset on the town's books, and for the year ending December 31, 1934, showed a gross income of $28,164.04 after deducting all operating expenses.

How the cost of electricity to the consumers of Ipswich has decreased as production has increased.





AND NOW . . . A DIESEL PAVER

THERE'S an old saying that there's nothing new under the sun. But that saying doesn't apply in the Diesel world. There *is* something new under the sun – the world's first Diesel dual-drum paving machine, built by the Ransome Concrete Machinery Company. Though the use of Diesel equipment in road building is not new, the application of Diesels to actual paving operations is.

Credit for this newest application of Diesels in highway construction goes to Barney Turecamo, president of the B. Turecamo Contracting Company of Brooklyn, one of New York's busiest contractors.

Turecamo is Diesel-minded, so much so, in fact, that when his latest purchase of equipment was ready to ship from the factory – a Ransome dual-drum paver for mixing and pouring concrete – he telephoned the manufacturer the day before and asked him to take out the gasoline power unit and install a Diesel. He didn't simply ask to have this done. He insisted on it!

Turecamo has had experience with Diesels. He also owns and operates a fleet of towboats. the B. Turecamo Towing Corporation. A watchful eye on his operating figures disclosed the fact that his Diesel towboats were making money for him principally through their lower operating and maintenance costs. As a result of these observations he later purchased several Diesel-powered tractors used by his contracting outfit as bulldozers in road building and for hauling around heavy pieces of equipment. In the contracting business it's the firm who does the most work in the shortest time at the lowest operating cost that makes the biggest profits.

As a shrewd business man, Turecamo realizes this and thinks of a new machine in terms of what it will do for him. His former paver had a production of 2,400 square yards a day. Powered with a 95 hp. six-cylinder gasoline engine it consumed between 40 and 45 gallons of gasoline per eight-hour day.

The new paver, operated with a 107 hp., six-cylinder Buda Diesel, lays as high as 4,000 square yards of concrete, six inches deep, per day, *exactly 66 2/3 per cent more work, and does it with a consumption of only twelve to fifteen gallons of 5½-cent fuel per eight-hour day,* with but a small increase in the crew!

Says the Turecamo Contracting Company: "Our new Diesel-driven paver gives us better mixed concrete since the drum revolves 22 rpm. as against 16 rpm. in the former gasoline-powered paver. It travels twenty per cent faster on its belt tracks. There is a saving of about fifty per cent in engine oil lubrication costs, because there is no crankcase dilution. It starts easily with battery power on a flip of the switch. There is no visible strain on the engine, even when it is started up from a dead stop with five tons of material in the drum. We're tickled pink with this job!"

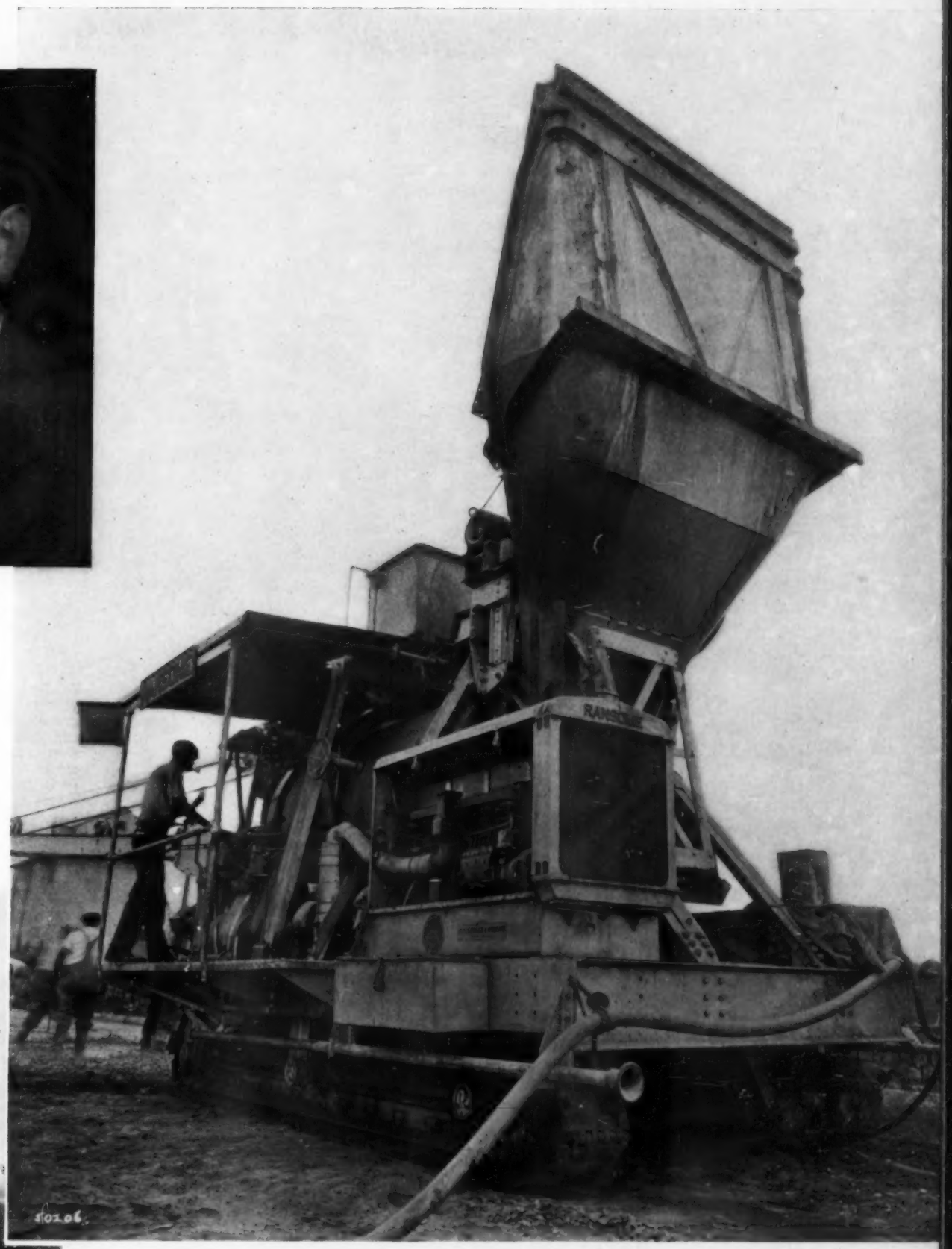
Out on Flatbush Avenue, Brooklyn, where the Turecamo Contracting Company is laying a three and one-half mile stretch of pavement from Avenue U to Rockaway Point Ferry, scores of other contractors and owners of road-building machinery have come to inspect the world's first Diesel-powered, dual-drum paver.

Its husky Buda Diesel, running like a watch, does quadruple duty with never a murmur. Here is what it does: (1) furnishes a steady stream of power to raise the heavily loaded skip, hour after hour; (2) turns the big dual drum containing the concrete mix, revolving it 22 times a minute; (3) swings the batches of mixed concrete out over the long boom to be dumped in place and; (4) provides tractive power.

The dealer who booked Turecamo's order for the new paver has several more live prospects now for pavers "just like Turecamo's."

Maybe you can find a new use for Diesels in *your* business. If you can you'll learn how much money they save.

Barney Turecamo, president of the B. Turecamo Contracting Company.



A close-up view of the new Ransome Dual Drum paver with the loader skip raised, showing the 106 hp. Buda Diesel engine.

DIESELS GO A-LOGGING

Where Brute Strength and Tireless Labor Count, Diesels Conquer Every Time

In Southern cypress swamps Diesels do yeoman work. The Caterpillar tractor above, equipped with a single drum winch, is bunching logs near Perry, Fla. Burton Schwartz, who owns the outfit and works for the Brooks-Scanlon Company, finds Diesels materially reduce logging costs.

On Vancouver Island, British Columbia, this Diesel tractor, equipped with a bull-dozer, is building a right-of-way through a burned-over timber tract. The machine, a Caterpillar, uses in an eight-hour day but 25 to 30 gallons of fuel.

Down on the banks of the song-famed Suwanee, the Caterpillar Diesel 35, shown at the left, is sounding a new note in logging economy. Skidding pine and cypress to the mill with Diesel tractors is speeding up profits for Sapp & Lewis of Jasper, Fla.

Handling these big sticks is merely play for the 80 hp. Cletrac Diesel tractor pictured above. The McLoud Lumber Company of McLoud, Cal., proves that Diesels make light work of it when it comes to the task of hauling away the fallen giants.

Hauling 56 tons of railroad ties over 18 miles of bare roads and across a frozen river, this Diesel tractor, a Caterpillar 35, makes the round trip every ten hours in high gear. The LePage Lumber Company in Manitoba, Canada, is thoroughly sold on Diesels.

At an average fuel consumption of 2¼ gallons an hour this 44 hp. Caterpillar Diesel tractor in Pine Falls, Manitoba, operates a portable sawmill all day, turning out 1,300 to 1,500 board feet of tough, green spruce per hour and then hauls heavy loads of pulpwood all night to the Spruce Falls mill of the Manitoba Paper Company, ten miles away.

DIESEL TRUCK CUTS HAULING COSTS 4c A MILE

THE acid test of any transportation unit is the willingness of owners to buy another of the same kind. Nowhere is this truism more applicable than in the automobile truck field. Ask the man who owns one and you'll generally learn the truth.

Up in Bedford Hills, Westchester County, New York, the Worden Sand & Gravel Company operates five trucks. The most recent addition to its fleet is an eight-ton Ward La France truck powered with a 125 hp. Cummins Diesel engine.

I. H. C. Davis, treasurer

Since placed in service on March 10 of this year, it has gone nearly 11,000 miles. To date not a single repair or engine adjustment has had to be made. At 5,000 miles the oil filter was changed. The lubricating oil is changed every 500 miles.

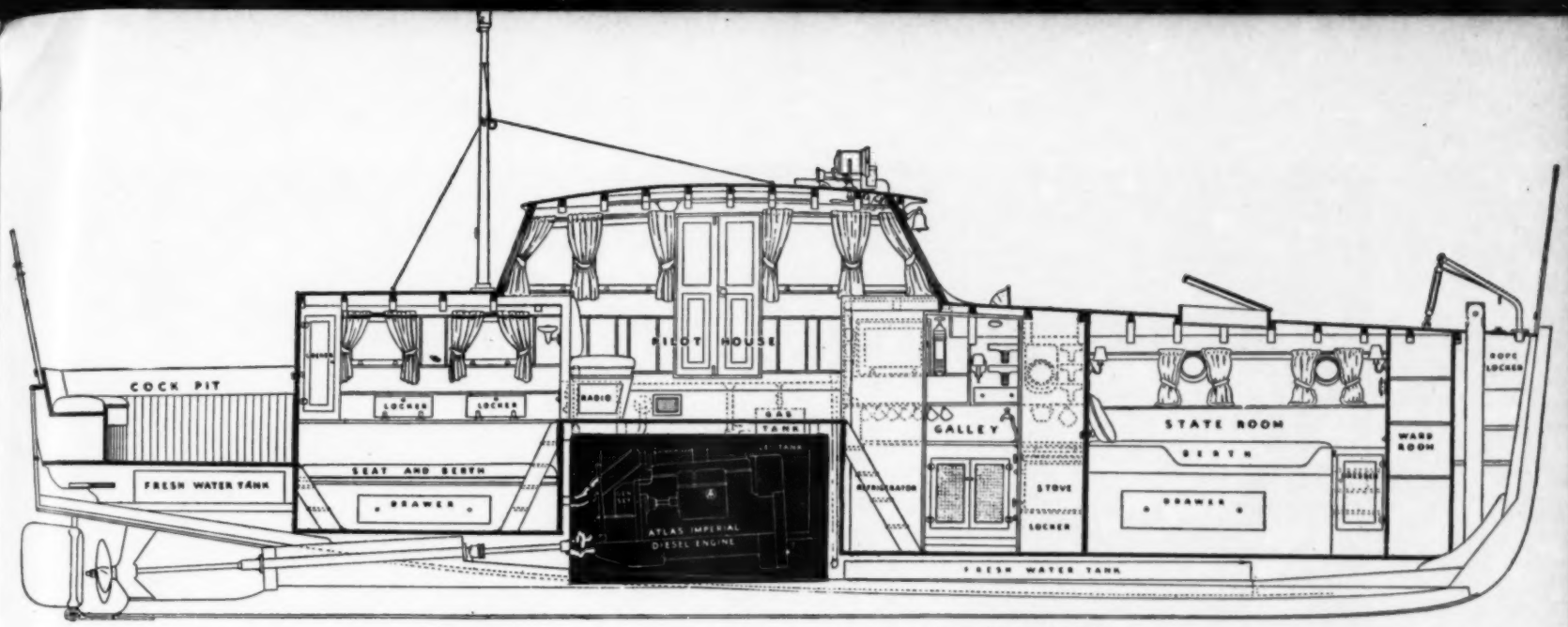
The truck, shown above, has five forward speeds and travels 34.7 mph. with a heavy load using direct drive. With the overdrive, used on long level stretches, it will do 48.4 mph. In the vicinity of the Worden Sand & Gravel pit are many short but very steep hills, and these the truck climbs without any seeming effort. Not only that. It can pick up speed on the hills without any apparent labor. According to its owners there is less vibration under load than with the gasoline-engined trucks. Its pay load is ten tons.

Most important, however, is the saving in haulage costs, approximately four cents a mile, as records show. Take this comparison. Recently the Worden Sand & Gravel Company delivered two loads to the same destination. The distance there and return was 141 miles. Two trucks, containing equivalent loads, were used, a gasoline and a Diesel truck. The gasoline-engined truck consumed $6.40 worth of gasoline. The Diesel-engined truck used $1.20 worth of fuel oil costing 6½ cents a gallon. Close-kept records indicate that the Diesel truck gets 7½ miles to the gallon.

Now the Worden Sand & Gravel Company plans to purchase another truck *and it will be a Diesel.* Either that, or install a new Diesel truck motor in place of the gasoline engine in one of their other eight-ton trucks.

"If you want to stay in business these days you've got to watch the economy end of it," says I. H. C. Davis, treasurer of the Worden Sand & Gravel Company.

Joseph L. Worden, president



Illustrating the small amount of space occupied by "Atimco's" Diesel engine.

DIESEL YACHT WINS RACES

WHEN a Diesel-powered yacht enters a cruiser race and competes against gasoline-powered craft AND WINS – that's news!

Small wonder, then, that F. H. Killberry of Oakland, Cal., is jubilant over the performance of his new Diesel-powered 40-footer *Atimco* which on May 11 won first place in Class B in the annual Richmond-to-Vallejo Shake-down race sponsored by the Northern California Power Cruiser Association and again on May 26 repeated the feat, winning first place in Class B in the William Randolph Hearst All Clubs regatta held on San Francisco Bay.

From Point Richmond to Vallejo it's some eighteen nautical miles, not much of a distance for a Diesel-powered boat to make her best showing, but the point remains that she won her laurels defeating seven runners-up and in so doing established the fact that Diesels of only 40 hp. can be relatively fast in a properly designed hull as well as safe and economical for any yachtsman to operate with no more difficulty than a gasoline engine.

Credit for setting down this feat in the annals of motorboating history goes to G. F. "Pete" Twist, well-known Southern California racing driver and *Atimco's* power plant, a 40 hp., four-cylinder, four-cycle Atlas Imperial Marine Diesel of 4¾″ bore and 6½″ stroke, developing its rated horsepower at 1,000 rpm. Running like clockwork the engine never missed a beat.

On heavy seas, as well as protected waters, she clicked off the knots without a murmur.

Atimco handles as easily and simply as an automobile and she is as free from excess noise and vibration. She is not only a good sea boat but is unusually dry in heavy going. There is more speed in her direct-drive lightweight Diesel power plant than her designers at first thought. She swings a 22″ diameter by a 16″ pitch, right-hand, three-blade propeller. In a test run over a six-mile course, *Atimco* was clocked at 10.1 miles per hour at 950 rpm.

Peter Swanson, head of the Swanson Launch and Boat Works of Oakland, her builders, says she is one of the best boats he has turned out in his many years of experience in building craft of this type. No one disputes him.

Atimco is a handsome, roomy cruiser, comfortable and fully equipped – a real floating home that would delight any yachtsman. Her cabins

"Atimco's" pilot house is roomy and shipshape.

A view of the after cabin finished in mahogany and red leather.

will sleep four people. Her toilet compartment has plenty of elbow room and contains in addition a wash basin and shower bath. Her pilot house amidships is large and ideal for lounging, furnishing excellent protection and good visibility for her navigator in inclement weather. A long, wide cockpit aft in the stern is splendidly adapted to fishing.

Beginning forward there is the usual rope and chain locker in the bow and directly aft of it another locker room with shelves, which is used for stowing suitcases and provisions. It is entered by a door from the forward stateroom. On this door is a full length mirror.

The forward stateroom contains two built-in berths with spearate dressers at the forward end of each. There are no upper berths in either cabin, another feature which makes for sleeping comfort. Over each berth is a reading light. Walls and side panels are covered with sealex of light pine color which forms an attractive contrast with the mahogany woodwork and trim. The tops of the dressers are Micarta.

Between the forward cabin and the bridge deck runs a passageway, on the starboard side of which is a dressing room and on the port side the galley. *Atimco's* galley is equipped with a four-burner Protane gas stove with oven, a sink supplied with water under pressure from two tanks below, dish racks and a refrigerator.

In keeping with the standards of good interior design the engine compartment is easily accessible. Located amidships the Diesel power plant is quite compact and occupies but a small portion of the total cubic contents of the hull. In addition to her engine there is a ¾ kw., 32-volt electric generator set, an electric bilge pump and the water pressure system. The engine is battery-started with current furnished by the generator set which also supplies current for the lighting system, pumps and radio.

. . . . *And now please turn to page 33*

Left—A corner of the forward cabin.

Below—Forty feet of luxurious cruising comfort. "Atimco" looks expensive to run, but actually runs ten hours for one dollar.

A MAIN LINE
DIESEL ELECTRIC LOCOMOTIVE

ENGINE Number Eleven Forty-One has gone into service on the Boston & Maine Railroad, the first Diesel electric locomotive designed and built for hauling standard railroad passenger equipment.

We have read of the *Zephyrs*, the *Flying Yankee*, the *Comet*, the *Rebel* – all of these complete streamline trains, operating as integral units. Now comes the Diesel electric locomotive for main line service, powered with a supercharged four-cycle Diesel engine, the forerunner of a number of such locomotives for main line operation.

This 78-foot car is made up of a body manufactured by the St. Louis Car Company, divided into engine room, baggage room and mail compartment. It is to haul standard railroad passenger equipment in high speed service. The car offers the utmost in flexibility, as it is suitable for varying types of service, schedules and train consists.

The body and trucks are equipped with a Westinghouse Diesel engine and Westinghouse electrical and auxiliary equipment. Whilst the car body is not strictly streamlined, the lines are sloped and smoothed out to give a good contour and to be in line with popular trend. All auxiliaries normally projecting outside the car are built in to aid this smooth exterior. Thus headlight, backing light, number lights and classification lights are of the streamlined type, whilst bell, horns, engine cooling radiators, made by the Young Radiator Co., are mounted under a grille.

The power plant consists of a single Westinghouse 12-cylinder, 9″ x 12″, four-cycle Diesel engine generator set rated at 900 rpm. The engine is supercharged with a Roots supercharger to obtain an output over its unsupercharged rating of 800 hp. It is direct connected to a single bearing D.C. generator, which supplies power for the four traction motors, two of which are mounted on each truck. The engine accessories are very complete and include Nugent oil filters and Burgess intake silencers.

Front half of engine room roof is removable as a unit for installation and removal of entire power plant. The auxiliary motors, excitation and lights are all of the 115-volt type and are operated from an auxiliary generator, which is mounted on a shaft extension of the main generator. A 54-cell Exide storage battery supplies light and auxiliary control power and is charged from the auxiliary generator during engine idling periods.

The air compressor for the air brakes is of the water cooled type and has a capacity of 120 cubic feet a minute. It is a low voltage compressor and is also transferred automatically from the auxiliary generator at running periods to the main generator at idling periods, assuring a continuous, full supply of compressed air at all times.

The engine jacket water and lubricating oil radiators are thermostatically controlled and are ventilated by two low-voltage blower motors driving 40-inch diameter, propeller type fans.

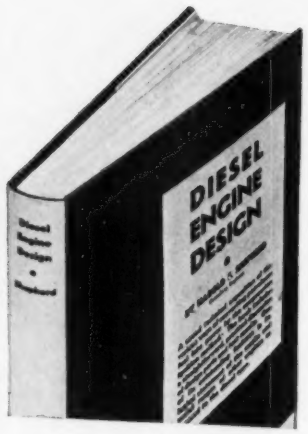
The engine is started from the storage battery, using the main generator as a starting motor. It can be started either from the engineer's cab, which is separated from the engine room by a partition, or from the engine room. When the engine is cold and no compressed air is available, the first start must be made from the engine room.

The engine load is regulated by means of the Westinghouse torque control system, by which the generator field strength is adjusted to load the engine to its full capacity at all times, regardless of the engine condition at that time.

Whilst this latest addition to Diesel equipped railroad units probably should be properly classed as a Railcar, inasmuch as the power plant, baggage car, mail car, etc., are incorporated into the one car, in service it will act as a locomotive and will haul varying passenger coach equipment, as the exigencies of the line require.

In the illustration of the engine to the left will be noticed the supercharger mounted immediately over the main generator. This is the first time that a supercharged four-cycle Diesel engine has been placed in railroad service, and it will be interesting to see how much extra power becomes available in actual service, from the supercharger.

The only book in the English language which treats completely the design of all parts of the fuel injection apparatus and combustion chambers in Diesel engines—



DIESEL ENGINE DESIGN

By **HAROLD F. SHEPHERD**

Consulting Engineer, Member American Society of Mechanical Engineers.

227 Pages, 6x9, $3.50

"DIESEL ENGINE DESIGN" will be indispensable to the engineer who needs a sound technical exposition of the various ways of converting petroleum fuel into power by the compression ignition method. Useful alike to builders, purchasers, and users of Diesel engines, it is not a mere recapitulation of the list of existing models, but presents a straightforward, practical discussion of design parts and test results. One of its outstanding features is its logical statement of the merits and useful ranges of other engines as opposed to the Diesel type.

This new book deals specifically with such subjects as combustion, the influence of the combustion-chamber walls, the fuel nozzle and pump, governing, cylinder heads, valves and valvegear, the injection of gaseous fuel, bearings and lubrication, pistons and piston rings, two- and four-cycle engines, inertia, the flywheel, and all other important factors in the design of Diesel engines. The Diesel engineer's objective is not so much to seek out the best fuels, but rather so to develop his product that it will burn a somewhat broad range of those refinery products which are in least demand for other purposes. To this end the studies on combustion-chamber gas and wall temperatures in this book are exceptionally valuable in connection with the developments which will inevitably result from more general practice of fuel testing.

The author, H. F. Shepherd, is an authority on the design and operation of Diesel engines. He has for many years been active in their development, and is the inventor of numerous special features and improvements well known to engineers in this field.

TABLE OF CONTENTS

Chapter I —Historical
Chapter II —Combustion
Chapter III —The Influence of the Combustion-Chamber Walls
Chapter IV —The Fuel Nozzle
Chapter V —The Fuel Pump
Chapter VI —Governing
Chapter VII —Cylinder Head, Valves and Valve Gear, Starting
Chapter VIII—Two-cycle Engines
Chapter IX —Injection of Gaseous Fuel
Chapter X —Bearings and Lubrication—Pistons and Piston Rings
Chapter XI —The Indicator Diagram
Chapter XII —The Inertia of Reciprocating Parts and Balancing
Chapter XIII—The Flywheel
Appendix —Reducing Calculations in Designing Crankshaft Members

---

DIESEL ENGINES, INC., *Book Dept.*, 2 West 45th St., New York, N. Y.

Enclosed please find $3.50 for one copy of the book, "Diesel Engine Design"

NAME_____
(Please Print)

ADDRESS_____

DIESEL CRUISER WINS RACES

. . . . *Continued from page 29* . . . .

Instead of using up valuable space, as is the case with many small yachts, *Atimco's* Diesel engine installation is thus so compact that it permits more hull room to be used for owner and guest accommodations.

The pilot house, located directly over the engine compartment amidships, is commodious and well arranged. *Atimco's* pilot can control every operation of the boat, motor, searchlight and whistle without moving out of his position at the wheel. An instrument board directly under his eyes tells him at a single glance everything he needs to know. At his left is a wide chart table. Between the control position and the chart table is the companionway leading to the forward stateroom.

Where are those folks who said cruising was a rich man's sport?

Listen to this! *Atimco* can be run for ten hours at a total cost of approximately one dollar for fuel and lubricating oil — remarkable for a 40-foot cruiser, heretofore almost unheard-of cruising economy! A ketch this size with a small gasoline auxiliary engine running all day would cost more than that.

With her Atlas Diesel *Atimco* has the remarkable cruising radius of 1,200 miles. Her two fuel tanks, one on each side of the engine compartment, store a total of 300 gallons of fuel.

Craft like *Atimco* herald a new day in the yachting world. Once an expensive pastime, fraught with the ever-present danger of gasoline vapor, cruising, thanks to today's smaller, higher-speed, more efficient Diesel, now comes within the range of the man who formerly hesitated about buying a boat, not because of the first cost, but because of the upkeep.

DIESEL ENGINES TO POWER BIG BRITISH FLYING BOAT

So successful have Diesel engines proved in aircraft recently in England that the British Air Ministry has ordered a number of them for one of its big flying boats. After installation they are to be put through a complete series of operational tests.

The engines ordered are being supplied by Napiers, who are building them under license from the German firm of Junkers. The particular type specified is the Culverin, of 720 hp.

For some time Imperial Airways, Britain's largest commercial flying organization, has been studying Diesels and it is reported that they, too, may purchase Diesel engines for test purposes within the immediate future. A British-designed Diesel aero engine made by the Bristol Company has already achieved distinction in world altitude records.

Nugent Pressure Oil Filters

This Boston & Maine Streamline Diesel Locomotive No. 1141 powered with one 800 H.P. Westinghouse Diesel Engine is equipped with two **Nugent Fig. 1116HA No. 4S Pressure Oil Filters, having a filtering area of 3744 square inches,** which insures long periods of operation without cleaning or changing crank case oils. These filters occupy a very small space.

The Nugent Oil Filters are made in eleven sizes from 5 gallons to 8000 gallons per hour capacity.

The New York Central, C. B. & Q., Santa Fe, Union Pacific, N.Y.N.H.&H., C. M. St. P. & P., Illinois Central, C. & N. W., Central Railroad of N. J., Canadian National Railways, and others are using them. They must be good filters.

SEND FOR BULLETIN 7A

MANUFACTURED BY

WM. NUGENT & CO., Inc.

415 HERMITAGE AVE. CHICAGO, U. S. A.

ESTABLISHED 1897

BOLTS, NUTS, STUDS

for Severe Services

Erie Bolts, Nuts and Studs are made to specifications from Commercial, Alloy or Stainless Steels and Non-Ferrous Metals. Bolting problems involving high pressure, high temperature or other unusual stresses are routine problems at Erie.

ERIE BOLT and NUT CO., 1215 LIBERTY STREET, ERIE, PA.

ERIE BOLT and NUT CO.

CHICAGO NEW YORK PHILADELPHIA

To Our Readers:

We have sent you this copy of DIESEL PROGRESS in the hope it will prove both interesting and instructive.

The rapid spread of DIESEL interest, of DIESEL application, is so far flung that you will find this magazine extremely useful to you, each month, in keeping pace with this development.

We are distributing, each month, from 10,000 to 20,000 copies, rotated over a list of some 50,000 names. In the normal course of events, you will receive a copy two or three times a year.

If this is sufficient, all well and good. On the other hand, if the book proves interesting enough, valuable enough to you to want it each month, then we suggest you enter a regular subscription at $3.00 a year and thereby insure receiving each and every copy as issued.

For your convenience, a coupon is attached herewith. Use it to send in your subscription. We also invite its use to advise us if you DO NOT wish to receive further copies of DIESEL PROGRESS, in case the magazine holds no interest for you.

Your co-operation in this matter will be sincerely appreciated, and our one hope is that we are producing a magazine of real help and value to you, for that is our purpose, to really contribute something worth while each month to the national sum total of DIESEL knowledge.

Our regular subscribers will ignore this notice, of course, because the magazine will reach you regularly each month.

DIESEL PROGRESS, 2 WEST 45TH ST., NEW YORK, N. Y.

Please enter our subscription for one year for which we enclose $3.00 ($5.00 *foreign*).

NAME .....

ADDRESS.....

DIESEL MOTORED VESSELS SHOW WORLD-WIDE GAINS

MOTOR SHIPS under construction throughout the world total 902,000 gross tons. This represents a gain of ten per cent over a year ago, according to *British Motor Ship*. Production since January 1, 1935, is more than double that of the corresponding figure for the first half of 1934.

The tonnage of motor ships that have been placed in commission between January 1 and July 1 of this year is 427,519 gross, which equals practically the entire output of last year.

Here is how the figures compare for the past three years:

MOTOR SHIPS ON ORDER

Date	*Number of Ships*	*Gross Tonnage*
July, 1932	79	540,000
July, 1933	86	470,000
July, 1934	130	822,000
July, 1935	177	902,000

MOTOR SHIPS COMPLETED

First 6 Months	*Number of Ships*	*Gross Tonnage*
1932	24	171,000
1933	29	160,000
1934	33	196,232
1935	67	427,519

Tankers now under construction aggregate a total of 370,000 gross tons, as compared with 348,000 of a year ago, while gross tonnage of passenger liners building amounts to 177,000, as against 114,000 last year.

British shipowners are far in the lead, accounting for 186,000 of the gross tonnage placed in commission during the first half of 1935. This new tonnage comprises several important fast cargo liners and a substantial number of Diesel tankers.

It is significant that the busiest yards are those which, in the main, are turning out motor ships. There is now under consideration a plan to scrap many steam-driven cargo vessels handicapped in competition against the more efficient and economically operated Diesel-driven ships.

In Denmark, a Copenhagen steamship company has just disposed of its last steamer and is replacing it with a motor ship recently launched. It now oprates six motor ships, having disposed of all its steamers during the past six years.

In Japan, 29 out of 38 large ships built under government grants since October, 1932, are motor vessels.

DIESEL TRACTORS ARE BRINGING BACK FARM PROFITS

. . . . *Continued from page 14* . . . .

Here are some Oregon rates furnished by the County Agent and based on the quotations of several owners of tractors, all of whom do some custom work for neighbors:

Costs per Acre With Diesel Tractors	
Plowing (about 5" deep)	$ .65
Weeding,	
Disking,	
Seeding	each .25
Harrowing	.10
Harvesting (by combined harvester)	1.25

Custom operators furnish all the tools as well as the tractor and the fuel it uses. These rates are just half what they were before the advent of the Diesel.

Roy M. Pike, general manager of the El Solyo ranch on the west side San Joaquin Valley area, has kept accurate cost figures on a fleet of six Diesel tractors over a period of eighteen months. His ranch is quite diversified, including a dairy herd as well as acreage devoted to the raising of vegetables and alfalfa, with orchards and vineyards. Altogether it consists of 4,000 acres of irrigated farm land. Each of his Diesel tractors operates over 2,000 hours a year, one of them having registered 2,382.7 hours by the recording dials used on every tractor. Mr. Pike says that he can easily retire his tractor investment in three years, the fleet of six having earned for him at the time this article was written close to $22,000 above their operating cost.

They burned 2.038 gallons of Diesel fuel per hour for the 35's with the 50's requiring only 2.779 gallons per hour. According to the head mechanic with whom the writer talked, service was no more than with gasoline tractors once the operators became acquainted with the Diesels. The Diesels were actually faster, he added, going a gear faster on many jobs, thus covering more acreage per day and doing more work a year than was the case with the gasoline tractors used formerly.

"We're sold on the Diesel!" said Roy Pike.

Other big operators who have been interviewed during the past year generally agree that with the exception of fuel troubles in the early months when the Diesels were first introduced there have been no serious difficulties. Quick changes by the manufacturers to overcome these, plus the availability of suitable fuels furnished by the leading oil companies and a better familiarity acquired by the operators, have since removed that drawback.

Across the border in Mexico, men who know Diesels like J. L. Vierhus, a custom farm tractor operator, maintained they found less trouble with Diesel tractors than with gasoline outfits in this torrid area where thermometers register 120 in the shade for months. Vierhus was a tractor service man in Russia for one of the big manufacturers and had had a year's experience with Diesel tractors when they were first brought out, before he went into business for himself.

Going over the Diesel tractors in the field, all of which are winning tremendous acclaim for their manufacturers, Caterpillar got the jump on the field and still outnumbers the others in most areas. All four in the field have only track-type Diesel tractors at this writing though both International and Allis-Chalmers are builders of wheel tractors in smaller horsepower. To date only three sizes have been available, but the manufacturers are working tooth and nail to get the Diesel into the smaller sizes from 15 to 20 hp. where the bulk of the tractor sales are found, and it may be expected that 1936 will see 20 hp. Diesel tractors available.

Cletrac's electric starter, whereby the tractor is started with a push on a button from the seat, is popular wherever seen. In the grain areas around Riverside and in the orchard farms of Santa Clara Valley in California it was making an impressive showing both as to speed and power. Its Hercules Diesel engine has apparently been set into a chassis that can "take it."

DIESEL POWER
ENGINES, GENERATOR SETS
COMPLETE PLANTS
Modern Units—10 HP. to 1200 HP.
Auxiliaries, Equipment, Service, Supplies
Conditioned, Rebuilt—Fully Guaranteed
Engineering — Sales — Installations
A. G. SCHOONMAKER CORP.
Offices, Warehouse, Shops
36-44 Hudson Street, Jersey City, N. J.
Telephone: BErgen 4-1448

We Supply TRAINED DIESEL ENGINEERS
From New York,
Chicago, Los Angeles and Seattle
Former Diesel, steam and gas engineers, machinists, shovel and caterpillar operators, sales engineers. These properly trained Diesel men will make valuable Diesel operators, maintenance men and salesmen for you. Many firms now look to us for their Diesel help. Write, wire or phone your requirements, we have the man you want.
HEMPHILL DIESEL SCHOOLS
Employment Service
NEW YORK: 31-28 Queens Blvd., L. I. City, N.Y.
LOS ANGELES: 2121 San Fernando Road
CHICAGO: 1253 Diversey Parkway
SEATTLE: 503 Westlake Ave., N.

YOUNG RADIATORS
for
DIESEL ENGINE COOLING
Westinghouse 800 H. P. Diesel Electric Locomotive
THE new Boston & Maine Locomotive is Young Radiator equipped. Roof type radiators, designed and manufactured by Young, cool the 800 hp. Westinghouse Diesel engines. Of sectional type construction, cooling is provided in the same unit for both jacket water and lubricating oil. Young sectional construction simplifies service problems. Ruggedly built to withstand the extremely hard service to which it is subjected in rail travel.
The design of this new heavy duty radiator is based on years of experience. Many leading manufacturers of power equipment rely on Young to solve their cooling problems. Young Quality construction is the mark of supremacy in the cooling field.
Write for descriptive literature
W. H. BENDUHN, 115 10th Street, San Francisco, Cal.
L. O. STRATTON, 556 S. Franklin Street, Denver, Colo.
YOUNG RADIATOR CO., RACINE WIS.
Young Quality

ZEPHYRS AVERAGE 31c A MILE —STEAM ENGINES COST 71c

CHICAGO, July 20. Actual operating figures now available, prove that the per-mile costs of the Chicago, Burlington & Quincy Railroad's streamlined Diesel electric trains are less than half that of steam locomotive drawn trains. Here are the per-mile expenses of operating the twin Zephyrs during the month of May, compared with a five-car steam powered train, such as would be required to perform the same service:

ZEPHYR

Maintenance of power plant	$ .0188
Maintenance of train	.0356
Fuel oil	.0141
Lubricating oil	.0108
Wages of crew	.1709
Train supplies and expenses	.0311
Terminal charges	.0351
TOTAL	$ .3164

STEAM TRAIN

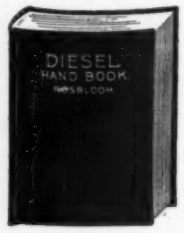
Locomotive repairs	$ .1466
Passenger car repairs	.0080
Fuel	.1190
Water	.0068
Lubricants	.0034
Locomotive supplies	.0019
Engine house expenses	.0263
Train supplies and expenses	.0468
Wages of crew	.2360
Lounge car attendant	.0077
Terminal expenses	.0375
TOTAL	$ .7120

As a factor in the cost comparison, Ralph Budd, president of the C. B. & Q. Railroad, cited the effect of high speed operation on rails and the roadbed. He stated that damage from the lightweight Diesel electric trains was negligible, as contrasted with the pounding of ponderous steam locomotives.

NEW PLANT TO BUILD DIESEL ELECTRIC LOCOMOTIVES

CHICAGO, July 29. An announcement made today by Mr. H. L. Hamilton, president of the Electro-Motive Corporation, a General Motors subsidiary, stated that production of Diesel electric locomotives will begin about November 1, with $11,000,000 to $12,000,000 worth of output scheduled for the first year.

The new locomotives will be built at the corporation's $2,000,000 plant at McCook, a suburb of Chicago. The plant is now half completed and is scheduled to be finished by September 1. The Diesel engines will continue to be built in Cleveland by the Winton Engine Corporation, a General Motors unit, while generators and electric motors will come from another subsidiary. The locomotives will be fabricated, annealed and assembled in the McCook plant.



JUST OFF THE PRESS

The Second Revised Print of the Second Edition (1935)

543 Pages, Beautifully Bound in Semi-Flexible Cover
Size 5" x 7"

"DIESEL HAND BOOK"

By JULIUS ROSBLOOM, *Chief Engineer Unlimited*

Officially Endorsed by the United Licensed Officers, U. S. A.

PROFUSELY ILLUSTRATED, LATEST TABLES, FORMULAS

A practical book for the practical engineer, written in a language which the person of the most limited education can understand. Text is plain and in the form of questions and answers.

Universally Used Throughout the World as the Standard Book on Diesel Operation

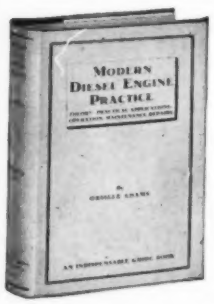
PRICE $5.00 PREPAID

Order from **DIESEL ENGINES, Inc.**

2 West 45th Street (*Book Department*) **New York, N. Y.**

MODERN DIESEL ENGINE PRACTICE

Theory—Practical Application—Repair—Maintenance



By ORVILLE ADAMS, *Consulting Diesel Engineer*

An Indispensable Guide for Every Owner and Operator

400 Engravings **650 (6 x 9) Pages**

PRICE $6.00

THIS is an up-to-date, authoritative and complete book on DIESEL ENGINES, including Operation, Maintenance and Repair. The new PACKARD DIESEL AIRCRAFT ENGINE is also fully described and illustrated. Every Diesel Engine Owner, Operator, Machinist, Engine Salesman, Engine Room Executive or all in any way interested in Diesel Engines should own a copy of this up-to-date work.

As a result of specialized and exhaustive research, practical Diesel information never before published is included in this book. The large variety of subjects covered can be judged by the chapter headings given below.

CHAPTERS

1. Evolution and History.
2. Introduction and General Considerations.
3. Technical Appliances of Diesel Engines.
4. Stationary Applications of Diesel Power.
5. Portable and Mobile Diesel Applications.
6. Operation of Diesels.
7. Operating the Bessemer Four-Stroke Cycle Solid Injection Engine.
8. Operation of the Air Injection, McIntosh and Seymour Diesel Engines.
9. Diesel Operating Experience.
10. Diesel Engine Maintenance Practice.
11. Engineering the Diesel Plant.
12. Engineering the Diesel Plant, continued.
13. Efficient Lubrication.

CHAPTERS

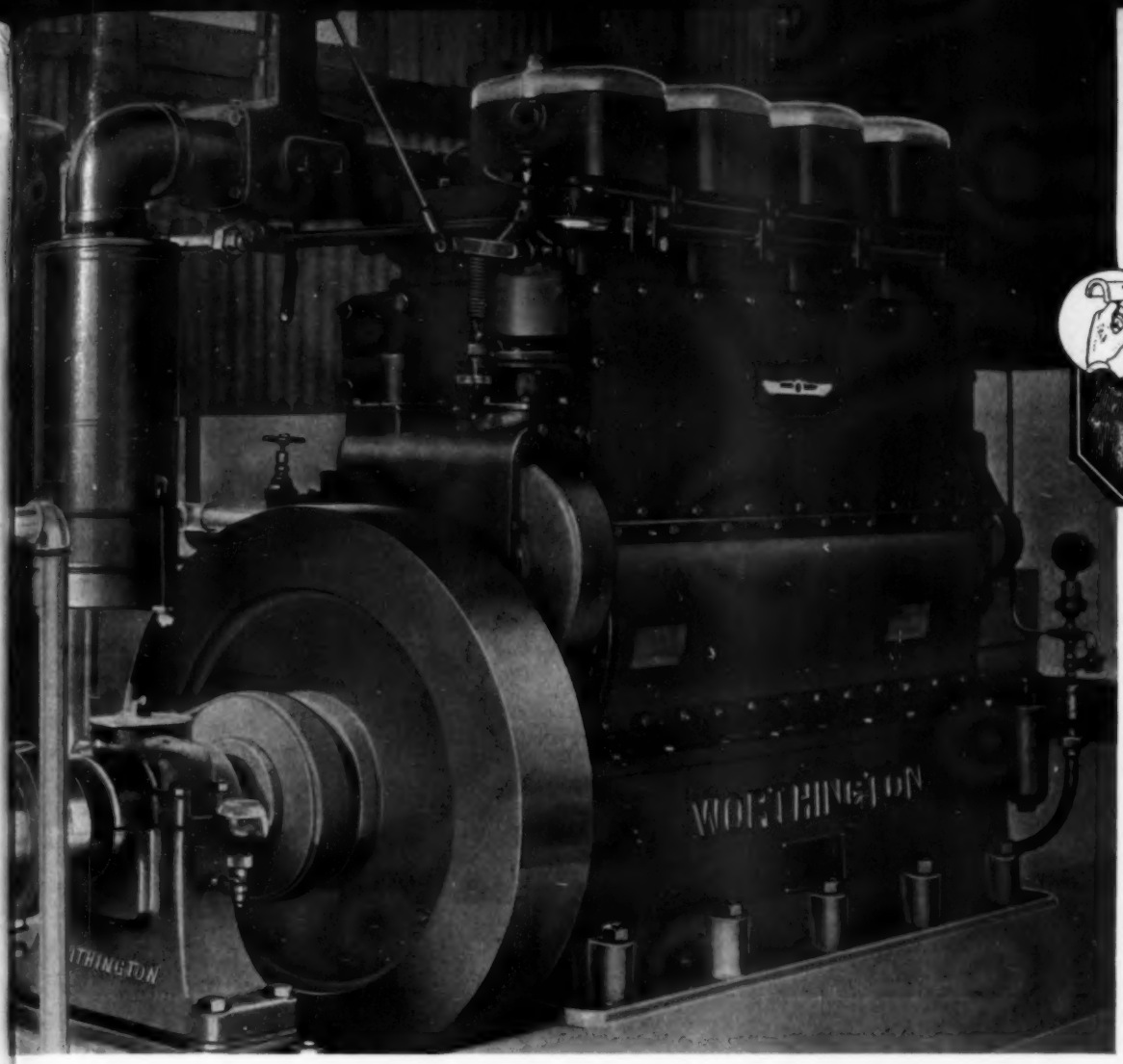
14. Piston Ring Relation to Efficient Lubrication and Economy of Operation.
15. Diesel Repair and Maintenance.
16. Packard-Diesel Aircraft Engines.
17. Packard-Diesel Aircraft Engines, continued.
18. Diesel Powered Railroad Locomotive Parts and Engine Operation.
19. Diesel Locomotive Engine Construction and Repair.
20. Diesel Locomotive Engine Fuel Injection Timing and Control.
21. Automotive Applications of Diesel Engines, including Tractors, Trucks and Busses.

Kindly Use Coupon

DIESEL ENGINES, Inc., *Book Dept.*, 2 West 45th Street, New York

Please send at once the book, Modern Diesel Engine Practice by Orville Adams. Find $6.00 enclosed.

Name *Street Address* *City* *State*



A Satco bearing-equipped WORTHINGTON *gas engine, type A-G, 4 cylinder, 60-hp., driving a Pomona pump through a right angle Peerless gear.*

"For want of a nail, the shoe was lost,

For want of a shoe, the horse was lost, . . ."

No one knows better the moral to be drawn from these old lines than the man who designs engines . . . or the man whose duty it is to keep engines running.

Bearings are relatively small details in modern power plants but they bear a responsibility out of all proportion to their size and cost. When they are functioning smoothly they are taken for granted. But when bearings fail, power stops, production drops and someone goes "on the carpet."

American Bearing Corporation will welcome an opportunity to help you solve your bearing problems. We have the men, machines and materials needed to design and manufacture bearings that will meet the requirements of today's high-speed engines. In Satco* bearing metal we have a material that has successfully handled some of the toughest jobs in industry.

If you would like to know more about our work in general and about Satco* metal in particular, wire or write. Performance records of engines equipped with our bearings will interest you and may show you the way to "save the nail, that will save the shoe, that will save the horse. . . ."

*A patented alloy manufactured by National Lead Company. Trademark registered.

AMERICAN BEARING CORPORATION

Affiliated with National Lead Company

INDIANAPOLIS CENTRIFUGAL American Bearings FORCE **INDIANA**

ATLAS DIESEL POWERS WINNING CRUISER!

PICTURED above is the new 40′ Diesel power cruiser "ATIMCO" which has aroused the interest of Pacific Coast yachtsmen by winning first place in its class in both the annual Richmond to Vallejo "shakedown race" and in the William Randolph Hearst All Clubs Regatta.

Both of these annual events are "over the bottom" races, in which the winner is selected because of his ability to maintain a predetermined speed over a measured course. In both races the "ATIMCO" outstripped all competitors by virtue of its accuracy of speed control.

The William Randolph Hearst All Clubs Regatta was a particularly difficult race because it was run in a very choppy sea, which caused a number of gasoline powered boats to flounder. Although the skipper of the "ATIMCO" had great difficulty in holding to his course because of the constant spray thrown over the pilot house, he brought his craft in as winner in its class.

The "ATIMCO" is the first pleasure craft to be powered by the new high speed, light weight ATLAS DIESEL recently announced by this company. It is significant that the first of these engines to power a pleasure boat powers a WINNER.

The new ATLAS DIESEL which has twice brought the "ATIMCO" to victory is a four-cylinder model, having a 4¾" bore and 6½" stroke. It is rated to develop 40 hp. at 1000 r.p.m. It operates quietly and smoothly with practically no vibration.

In this new DIESEL we bring to the owners of small pleasure craft and fishing boats a power plant that will be a credit to the ATLAS DIESEL reputation for stability and reliability. Owners of small boats can now double their cruising radius at one-third the cost of gasoline power. Twice as far at a third the cost means that the ATLAS DIESEL will furnish power at just one-sixth the cost of gasoline power. That's real boating economy!

A leaflet which illustrates and describes this new ATLAS DIESEL will be mailed to any yachtsman on request.

ATLAS IMPERIAL DIESEL ENGINE CO.
OAKLAND, CALIFORNIA, U. S. A.

ATLAS IMPERIAL